The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Notes and Comments

The Society of Chemical Industry

SOUTH Wales, the youngest of all the eighteen sections of the Society of Chemical Industry, has had the distinction of entertaining the Society on the occasion of its 53rd annual general meeting this week, and has discharged the responsibilities involved in the organisation of a meeting representing all parts of the United Kingdom and several of the Colonies with a measure of success meriting the warmest congratulation. The numbers attending the meeting were, we believe, slightly below those registered on some previous occasions in provincial centres, but the programme was as attractive as any that had preceded it, and the civic authorities and representative local industries enthusiastically supported the efforts of the local section to provide the visiting members with pleasurable memories of their visit to the Metropolis of Wales. The works visits and pleasure excursions were of exceptional interest, and Cardiff's wonderful city centre, with its City Hall, National Museum and University and Technical Colleges all within a few yards, formed excellent headquarters for the business and technical sessions and the principal social events.

The business meeting itself struck an optimistic note, in that the Council was able to announce in its annual report that the decline in membership over the past five years had been arrested and that there had been a net increase of nine members during the past twelve months. The accounts, too, although they still revealed a deficit on income and expenditure account, were much more favourable than they were twelve months ago. With Alderman Edwin Thompson, of Liverpool, in the presidential chair, the Society can look forward hopefully to a year of increased prosperity.

Dr. J. T. Dunn's Presidential Address

MANY of Dr. J. T. Dunn's predecessors in the presidential chair have been leaders in particular industries, able to give authoritative and interesting accounts of progress made in their own lines of work, but, to quote his own opening words, the analytical and consulting chemist is a sort of chemical Jack of all Trades, knowing something of almost every industry, but not conversant intimately enough with any, from the inside, to speak with authority about it, whilst the technicalities of his own profession are hardly suitable for a presidential address. Dr. Dunn, however, presented an illuminating comparison between the state of the British chemical industry immediately before the foundation of the Society fifty-four years ago and its position to-day.

In the striking development which he indicated in outline, the Society of Chemical Industry has played a not inconspicuous part. The papers read at its sectional meetings in all parts of the country have been of great importance and the discussions and interchange of ideas following the papers have been a constant stimulus to further activity. Its presidential addresses have specialists' reviews, and at least one-third of them have emphasised with great insistence, from the most varied points of view, the importance of thorough training and of research. Dr. Dunn's address on Tuesday was no exception to the high standard set by his predecessors in this respect; in addition, it laid timely emphasis upon the need for the services of the chemist in almost every industry at the present time. Dr. Dunn has been a member of the Society since its inception, and he is proud of its progress and development.

An Invitation to Canada

ONE of the features of the annual meeting of the Society of Chemical Industry on Tuesday was the cordial invitation extended by Mr. R. D. Whitmore, on behalf of his Canadian colleagues, to hold the annual meeting in 1936 at Ottawa or Montreal. The invitation was enthusiastically received, and we have no doubt that it will be accepted. The Society has already crossed the Atlantic for its annual meeting on four occasions, three times to meet in New York (in 1904, 1912, and 1928) and once in Montreal, in 1921. It may well be that within the next two years some progress will be made in the direction of closer co-operation between the various chemical organisations in this country, to which, as we anticipated last week, some reference was made in the annual report, in which case the visit to Canada in 1936 may be representative of even wider interests than those embraced in the Society of Chemical Industry.

We hear that Mr. J. Davidson Pratt, secretary and general manager of the Association of British Chemical Manufacturers, has been elected chairman of the special committee appointed by the principal organisations to explore the possibilities of increased co-operation, and that it is expected to prepare a report before the end of the present year. There is, therefore, good ground for hoping for some definite progress, although, as we

have pointed out on more than one occasion, the prospects of actual amalgamation are decidedly remote. Meanwhile, the Society has received a hearty invitation to meet next year at Glasgow, which has already been the venue for four annual meetings.

The Sinews of Development

THE President of the British Science Guild has truly reminded us that to-day scientific development moves very rapidly and what may appear to be but a scientific curiosity often enters profoundly into the life of the nation. It is natural, therefore, that men in as close touch with research and industry as Lord Melchett and Sir Richard Gregory should be concerned to keep those directing the affairs of the nation in close touch with new developments. Sir Richard Gregory, chairman of the Guild, is perhaps not unnaturally troubled about the future finance of the Department of Industrial and Scientific Research. We share his concern. The work done by the Department either directly or indirectly through the many research organisations is essential to the well-being of the nation. There is no other national body that can watch and aid the development of "scientific curiosities"; the individual manufacturer has energy and foresight but his finances do not permit him to pursue scientific curiosities; thus may other nations advance ahead of us unless we maintain and even extend our present activities in this direction.

It is, therefore, with some misgivings that we reflect that the Department is a Government institution and like other similar bodies is liable to curtailment or even to extinction at the whim of the political party that happens to be in power. Research must be planned for many years ahead, and there is no greater deterrent to good work than a feeling of insecurity. Sir Richard Gregory suggests that a definite part, perhaps 5 per cent., of the nation's tariff revenue, which is estimated at between £30,000,000 and £40,000,000, should be allocated to the Department and to research associations. This would provide some £2,000,000 a year for current expenditure, for financing unforeseen developments in any particular year and for a permanent endowment of the Department. At the end of some 20 or 25 years the work would then be carried on the annual income from the trust funds so that no further Parliamentary votes would be needed. The need for scientific protection against trade competition and foreign commercial development is no less great than was the need for armed protection during the war; the only difference is that one was an urgent bodily danger, and the other is more insidious. It hardly seems feasible that a nation, which could find some £3,000,000 a day to combat the one, cannot find £2,000,000 a year for a limited time to combat the other.

Leadership

IN some quarters, perhaps deep below the surface, perhaps too open to be pleasant, there is a conflict between the engineer and the chemist. Men who have been trained as engineers are apt to regard the chemist as an inferior being. In the course of our industrial life we have met this feeling many times. It is not to be dismissed as foolishness since it has its roots in soil of some sustenance—not on stony ground. Whilst there are exceptions, it is a fact that there is a difference of mentality between the chemist and the engineer. The chemist lives in his laboratory, working with chemical apparatus, with books and in semi-solitude. He converses largely with those who have the same mentality as himself. While the university lecturer in pure science and arts is often an extreme instance of academic aloofness, the works chemist also possesses it to some extent, the research chemist more than the process chemist. The engineer, on the other hand, lives among the workmen, he deals with plant and materials on the large scale, and a mistake by him may involve, not a tiresome restart to a brief experiment, but the loss of hundreds of pounds and even of human lives.

Qualities of leadership are required in those at the head of a concern to enable men with the divergent characteristics of the chemist and the engineer to work together to the best advantage, when both are on an equality. That is, perhaps, one reason against too great specialisation in those who would become successful managing directors. Leadership, however, is not confined to those who control a business. It is time that directors realised that high chemical knowledge is not the first requisite in the chief chemist of a large laboratory; nor even is extensive experience of the work the best guiding principle in the selection. Like the engineer, those in charge of laboratories must be first of all leaders of men.

The Job of a Chief Chemist

THE job of the chief chemist is not to make wonderful discoveries unaided; if it were so there would be no reason for supporting him with a staff. His job is to see that his department produces work of the highest quality; in short, that adequate return is secured for the money expended on the department. This means that every man must give of his best. The chief of any department, therefore, must not only be fully qualified technically to deal with the problems of the industry as they arise, but he must be a leader of his men. Men—and even more, women—are peculiarly responsive to their atmosphere. A word of encouragement may convert idleness into enthusiasm; the wrong treatment may ruin a department. We are impelled to these remarks by a bad case that recently came to our notice. The chief of the department is a man of some eminence in his line; but he has the unfortunate characteristic of lack of faith in his own powers. This shows itself—as it does all too frequently—in a fear of allowing any credit to subordinates; the subordinates must not even know fully the significance of the work they are doing. Reports are issued only in the name of the chief, and the name of the experimenter who carried out the work, and with whom the ideas may have originated, is rigorously suppressed. This is *said* to be "team work"; it is the deliberate suppression of the individual to the glorification of one individual!

The Englishman is individualistic; he only works well when, although a member of a team he has individual responsibility of the highest order. Probably that national necessity finds an adequate expression in the game of cricket—our national game not played outside the Empire. There is something to be said—strange though it may appear—for regarding sportsmanship as second only to technical knowledge among the qualifications of the head of a department. The true sportsman, in the highest sense of the word, gets the best work done.

Society of Chemical Industry

Cardiff Technical College, the Meeting Headquarters.

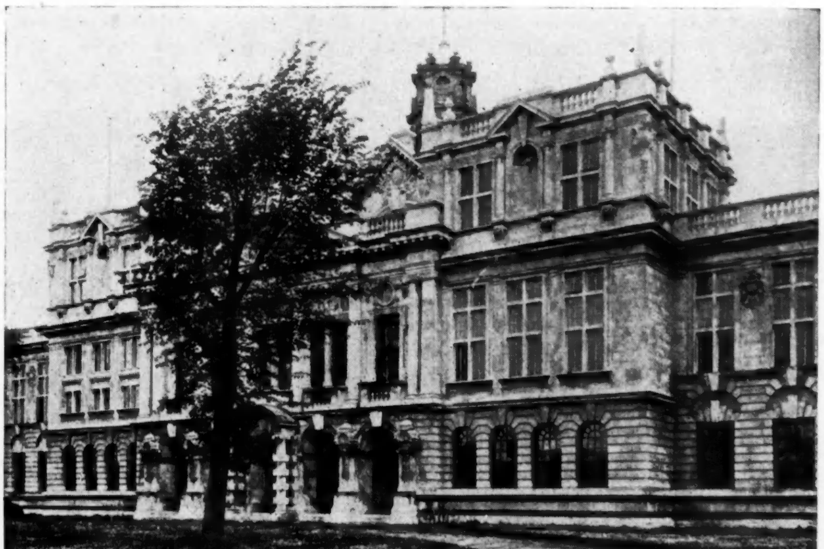
Fifty-Third Annual General Meeting at Cardiff

THE fifty-third annual general meeting of the Society of Chemical Industry was held at Cardiff, from July 16 to 20, under the presidency of Dr. J. T. Dunn (Newcastle-on-Tyne). Commencing with an informal reception at the University College on Monday evening, the week's programme comprised, in addition to the annual business meeting at the Technical College on Tuesday morning, the presentation of the Messel Medal and delivery of the Messel Lecture by Sir Harry McGowan at the National Museum of Wales on Thursday, and meetings arranged by the Plastics Group and the newly-formed Road and Building Materials Group on Thursday and Friday respectively. The annual dinner was held at the City Hall on Thursday evening, and there was a civic reception at the City Hall on Tuesday. The meeting was also noteworthy for a number of works visits and pleasure excursions in South Wales, particularly an all-day trip to Swansea on Wednesday with dinner at the Langland Bay Hotel. About 200 members of the Society and friends were the guests of the South Wales Section, whose secretary, Dr. E. A. Rudge, discharged the secretarial duties connected with the entire programme.

The members and guests were received at the Technical College on Monday night by Dr. J. T. Dunn, president, Principal Coles, of the Technical College, and Mr. C. M. W. Grieb, chairman of the South Wales Section, and inspected the industrial chemistry department of the College. Light refreshments were served.

The annual business meeting was held on Tuesday morning in the Technical College, Dr. J. T. Dunn, president, being in the chair.

Councillor JAMES GRIFFITHS, Deputy Lord Mayor of Cardiff, who apologised for the absence of the Lord Mayor, offered the Society a cordial welcome to Cardiff. Remarking on the increasing extent to which Cardiff was now used for conferences of important organisations, he said he had recently told the mining managers that they were one of the most important organisations in the country because they dealt with the greatest asset of the country, *viz.*, coal. In welcoming



University College of South Wales and Monmouthshire

the Society of Chemical Industry, however, he could truthfully say that he was welcoming one of, if not the greatest, organisations in the world, because every nation and every man and woman in the world was dependent upon the chemical industry in some form or other.

Principal C. COLES (Cardiff Technical College) associated himself with the welcome offered by the Deputy Lord Mayor and briefly referred to the excellent educational centre which Cardiff now is. It had been impossible in recent years, he said, to export much coal and therefore the endeavour was being made to export brains from their educational institutions in South Wales to make up the leeway.

The PRESIDENT, expressing appreciation of the welcome extended to the Society, said this was the first annual meeting which the Society had held in Cardiff, but the reception already accorded the members and the arrangements that had been made for them during the week made it clear that although other cities might be larger and different in some respects, Cardiff could certainly hold its own with them when it came to hospitalty.

Annual Report of the Council

Mr. H. J. POOLEY, general secretary, then presented the annual report of the council. The report showed that there were now 4,342 members on the register, as compared with 4,333 at July 11, 1933. The number resigned or removed from the register on account of default in subscription was smaller than in latter years, and though there was a heavy obituary list the net figures showed the decline of recent years to have been arrested. Since the last annual meeting 263 members had been elected, 28 members had been restored, and the losses from death, resignation, etc., had been 282. During the last five years the membership had been as follows: 1929-30, 4,596; 1930-31, 4,541; 1931-32, 4,410; 1932-33, 4,333; 1933-34, 4,342.

The list of fifty-two members who had died during the year contained many names that were familiar within and without the Society. Until recently seventy-five of the original three hundred founders remained on the register. This year no fewer than nine had passed away, namely—W. D. Borland, F. W. Fletcher, Sir Richard Garton, W. F. Henderson, T. J. Hutchison, J. B. Orr, E. P. Potter, T. W. Stewart and W. G. Whiffen.

All local sections had been actively engaged during the session and though programmes tended rather to become longer than to be curtailed the practice which the Society encouraged of holding joint meetings with other bodies on appropriate subjects and joint meetings between sections and subject groups within the Society was extending. The total number of meetings claiming the attention of members, authors, and publishers was decreasing, while the quality of the work presented improved. Three hon. secretaries were retiring: Mr. A. McCulloch who had worked for so many successful years for the Manchester Section, Mr. Coll McFee who completed a second period of service for the Montreal Section of which he was the original secretary, and Mr. Donald McDonald who had served the Chemical Engineering Group so well.

The Road and Building Materials Group was formed as a result of a conference on road materials organised by the Chemical Engineering Group, the Plastics Group, and the London Section, at Islington, in November, 1933. The need for this group was demonstrated in the rapid enrolment of members, the majority of whom were not already members of the Society.

The Chemical Engineering Group completed its twelfth year of activity, during which it held twelve meetings.

A full programme of eleven meetings was completed by the Food Group, a notable feature of which was the International Symposium on Bread and Milk held in November. The Group presented a memorandum to the Parliamentary Committee on Food Law Reform, the value of this assistance being warmly acknowledged by the committee. The Group again organised the Hygiene of Food Section at the Royal Sanitary Institute's Health Congress this year in Bristol.

The membership of the Plastics Group (140) grew steadily and in view of the limited field may claim to be reasonably representative of the chemical strength of the industry. During the past session nine meetings, mainly held jointly with other sections, had been conducted.

The Society's Jubilee Memorial Lectures inaugurated in 1931 had acquired the prestige the council set out to attain at the time of their foundation. The lecturers appointed for the session 1934-35, were Mr. C. J. T. Cronshaw (" In Quest of Colour "), and Professor T. P. Hilditch (" The Fats: New Lines in an Old Chapter of Organic Chemisty ").

Awards of Medals and Prizes

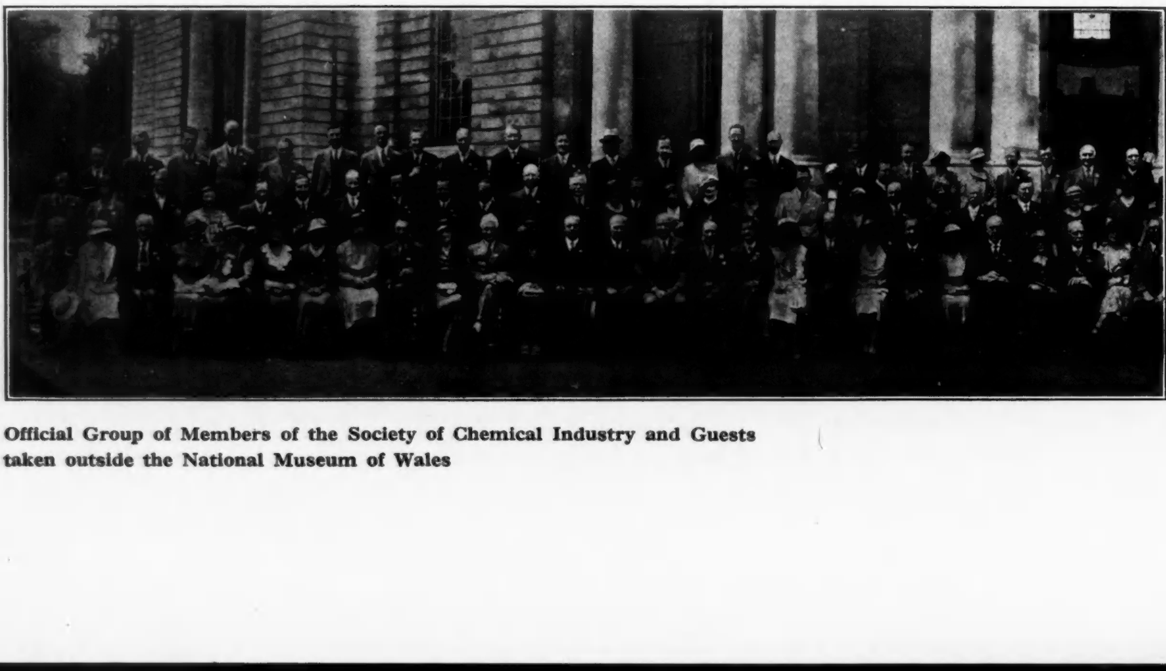
Nine applications had been received for the 1934 John Gray Jubilee Scholarship, and the council had that day made the awards to R. H. Farmer, son of Dr. R. C. Farmer, of Woolwich Arsenal.

There were in the gift of the local sections several distinctions, usually awarded annually, which this year were distributed as follows: America—The Perkin Medal, founded in 1906 in honour of the fiftieth anniversary of the coal tar industry, awarded to Professor Colin G. Fink, of Columbia University, who gave an address on " Chemistry and Art."

The Chemical Industry Medal (Grasselli Medal renamed in 1933) was last awarded to James G. Vail, of the Philadelphia Quartz Co. His address was entitled " The Culture of Certain Silicate Gardens."

Montreal—The Society's Bursary for the best undergraduate's paper was awarded to T. W. E. Harris, for his paper on " Petroleum Oil Refining."

Liverpool—The Society's prizes were awarded as follows: Senior—D. N. Grindley; Junior—C. E. Ryder.



Official Group of Members of the Society of Chemical Industry and Guests taken outside the National Museum of Wales

The Leverhulme prize, limited to chemistry students at Liverpool University, was awarded to T. G. Green.

Newcastle—The Saville Shaw Medal presented usually in alternate years to students in metallurgy and inorganic chemistry, was awarded in both sections last year to E. J. Mitchell for his paper "Aluminous Silicon Alloys," and to Miss E. Ferrell for "Atomic Hydrogen."

The audited accounts for the year ending December 31, showed a slight deficit in spite of further reduction in expenditurue. Receipts declined in most of the principal items, but the adverse balance was appreciably less than in the previous year.

Consolidation of Chemical Associations

Some advance had been made in the campaign to secure better service at a lower cost to the members of the various chemical organisations and to distribute the burden of publications. The movement had been supported energetically by the Society's delegates.

Dr. R. T. COLGATE, hon. treasurer, presented the accounts for the past year, and drew attention to the fact that there was a deficit of £311. That, however, was not so bad as it might seem because in the previous year there was a deficit of £505. The outlook was brighter than it was this time last year, when the members' subscriptions were down, as compared with the previous year, by no less than £400, as against £25 on the present occasion.

Mr. H. B. WATSON seconded the adoption of the accounts, and the proposal was adopted.

The auditors, Messrs. Price, Waterhouse and Co., were unanimously re-elected.

Mr. R. D. WHITMORE, past-president of the Canadian Section, moved a vote of thanks to the officers and others. He had, he said, been charged with the duty of bringing greetings to the Society. The first came from the Canadian Chemical Association, and in this connection he mentioned that a few years ago some of the leaders of the industry in Canada were impressed with the movement that was taking place in Great Britain for the consolidation of chemical societies.

His second greetings, said Mr. Whitmore, were from the Society of Chemical Industry in Canada, and the third came from his colleagues in Ottawa and with them an invitation for the Society of Chemical Industry to hold its annual meeting in 1936 in Canada, either Ottawa or Montreal. He believed, he added, that that had almost been settled as a certainty. Mr. Whitmore added that he could not do better than start the propaganda at once and to urge the members now to start saving for that trip. He assured them of a very hearty welcome. In a comment on the annual report, Mr. Whitmore called attention to the "Other Awards," and suggested that there should be added to the list the fact that the Ottawa Section presents an award to a student or undergraduate of Queen's College in the form of a bursary for a year.

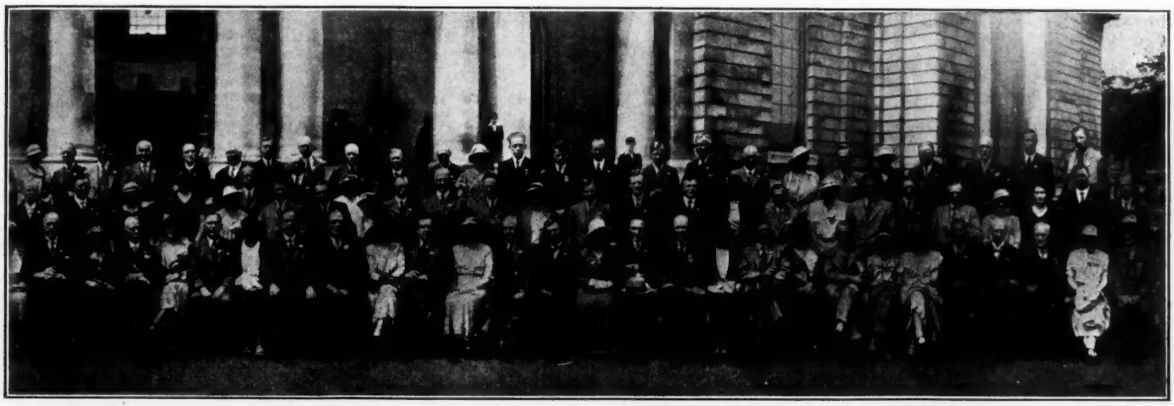
The vote of thanks was accorded with hearty acclamation.

The PRESIDENT said that although he had been asked to acknowledge the vote of thanks he really wished to supplement the thanks that had been extended to the officers. His experience on the Council and as president had shown that there was no difference between the honorary officers and the paid staff; they were all imbued with the greatest regard for the welfare of the Society and they did not spare themselves in any way.

Science and Industry: The Fertility of Ideas

Dr. J. T. Dunn's Presidential Address

DR. J. T. DUNN, (Newcastle-on-Tyne), in his presidential address on "Science and Industry: The Fertility of Ideas," contrasted the state of British chemical industry before the foundation of the Society with its position to-day. We still have our "heavy chemicals," he said, but the methods of their production have been revolutionised, and in some instances reversed. The old Leblanc process had disappeared, and has been superseded largely by electrolytic methods. Instead of making chlorine from hydrochloric acid, we now make hydrochloric acid from chlorine. We make, completely, a large proportion of our own dyestuffs, and in some branches of that industry we lead the world. Our fermentation industries have been developed and produce not only potable alcohol, but acetone, butyl alcohol, and a variety of other products used in industries as various. We make alloys having almost every desired property, whether it be resistance to corrosion in our incorrodible steels, or extreme lightness in our aluminium alloys; and we have pressed into service, in making these alloys, a large number of the so-called rare metals, some of which were mere chemical curiosities, and some of which had not even been isolated from their compounds, at the time when the Society was founded. The whole galaxy of synthetic drugs, so varied in their therapeutic effects, and indispensable in the pharmacopœia of to-day, have come into being, and the chemist engaged in research can purchase for his work almost any known compound, organic or inorganic, that he needs. The same may be said of the enormous cellulose industry, which provides us with our so-called artificial silks and leathers, and our kinematograph films. Our gas works and our coke



Official Group of Members of the Society of Chemical Industry and Guests taken outside the National Museum of Wales.

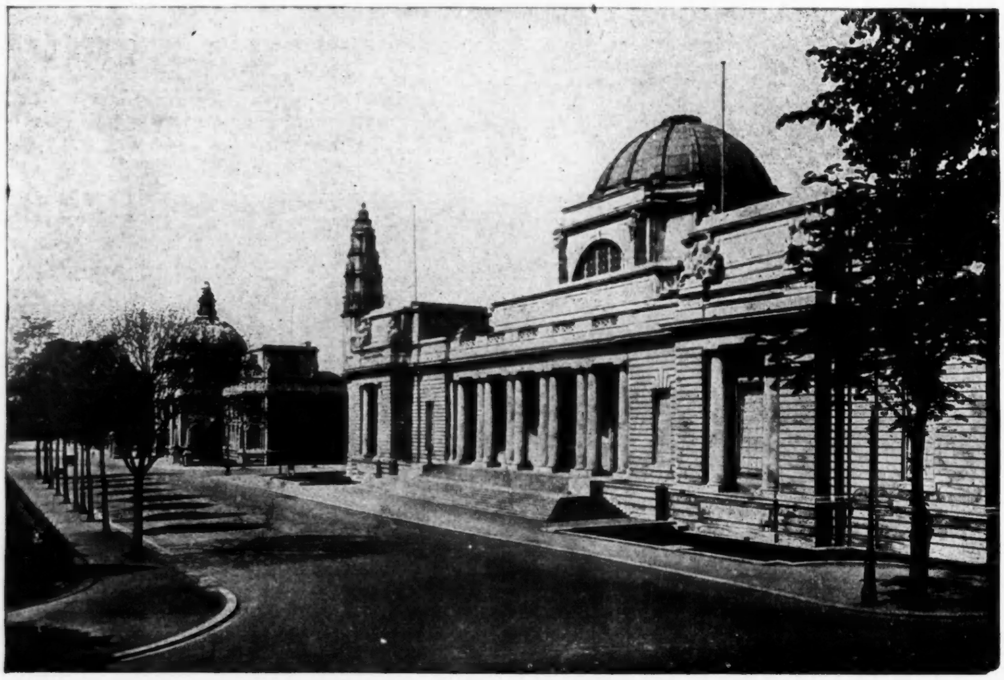
Cardiff City Hall and Law Courts

ovens, besides furnishing us with gas and coke, have become veritable chemical works, producing substances of the most varied types and applications; and we have recently seen the amazing development of the plastics industry, which furnishes us with an almost infinite variety of useful and beautiful products from engineering and electrical plant to the knick-knacks of our writing desks and drawing rooms.

Fifty-four years ago there was, on Tyneside at least, little or no investigation going on into the processes of alkali manufacture. Progress was looked for in the direction of improvement in the plant rather than in the process itself, and discussions (sometimes very fierce discussions) took place very largely on the merits of mechanical furnaces as compared with those worked by hand, or of A's mechanical furnace as compared with B's. Some of the works had what was called by courtesy a laboratory—usually a semi-derelict hut in which worked the "chemist." The chemist was usually a boy who had been picked up in the neighbourhood and had been taught how to test the strength of samples of acid and alkali and bleach that were brought to him; who knew little else; and who, if he strayed from the precincts of his laboratory into other parts of the works, did so at his peril. To have suggested, in those days, that a chemist could have been of any use in a colliery or at coke-ovens would have been to imperil your reputation for sanity. Obviously, under these conditions no progress was possible, other than was afforded by the importation of improvements or new processes from outside; the industry was not a living organism, growing from within.

Fortunately, that state of thing has passed away. We learnt something from German chemical industry as to the importance of the chemist; we received a very rude and drastic lesson during the war; and now we have realised that chemical industry cannot be static—that the old order must constantly change, if we are not to stagnate, and give place to new; and that we must constantly be making investigations into the possibilities of improvement and development. Accordingly, all our industries are now staffed with chemists; chemists, too, whose business is not merely to check supplies and products and carry out routine testing, but to search out improvements in processes and new directions for advance; who are familiar with all the details of the works as well as of the laboratory; whose advice is sought and appreciated, and whose opinions are deferred to.

Perhaps the most striking feature in the change that has taken place is the importance that is attached to research. In the laboratories of nearly all our larger firms certain of



The National Museum of Wales

the chemists are occupied wholly in research—the search after new knowledge. The classical instance is, of course, the enormous modern development of the electrical industry, all based on the discovery of electromagnetic induction by Faraday, whose experiments were pure scientific inquiries, and were undertaken without any thought of industrial application.

It behoves those who have the conduct of our industries not to confine themselves to the straight path of "directed" research, but to encourage as far as they may the pursuit of this "fundamental" research by those of their research staff who have the *flair* for it. It may for long yield nothing, industrially speaking; it may, at any moment, bring forth fruit abundantly.

Chemical industry has indeed made great strides; it has branches out in all directions, so that there is hardly any aspect of our daily life in which we do not come into contact with the work of the chemist. How far does the general public realise the manifoldness of its debt to the chemist? Professor Johnston, who was professor of chemistry in the University of Durham, said, in the introduction to that once popular classic, little read perhaps, but well deserving to be read, nowadays, "The Chemistry of Common Life," "The common life of man is full of wonders, chemical and physiological. Most of us pass through this life without seeing or being sensible of them, though every day our existence and our comforts ought to recall them to our minds. . . . Every day new arts sprout up, as it were, beneath our feet, as we linger in our laboratories, observing the new reactions of probably new bodies; and in each new art is seen a new means of adding to the comfort and luxuries of mankind, of giving new materials and facilities to commerce, and of increasing the power and resources of nations." If this could be said eighty years ago—for "The Chemistry of Common Life" was published in 1854—how much more strongly could it be said at the present time? In all directions, in our daily life, we owe the amenities which we enjoy to the labours of the chemist.

Miss Amy Johnson makes a solo flight to Australia. At once the feat is heralded in the newspapers, and she becomes a public character—not in Britain only, but all over the world. Her ancestry, appearance, demeanour, are described, her photograph is broadcast by the papers, her views are sought, her sayings chronicled, her every movement is followed, and she achieves a fame as widespread as Julius Cæsar, Columbus, George Washington, or the Emperor Napoleon. I should be the last to belittle her achievement, or withhold admiration for her courage and endurance. But, among the idolising public, how many are there who, whilst bestowing the tribute which is her due, recognise also the labour, the thought, and the courage, that have made possible the construction of the aircraft, without which her feat would have been impossible, and to which she owes her entire opportunity?

There are signs, however, of some little improvement in this respect; and the Society is doing not a little towards educating the public into a knowledge and recognition of its debt to chemistry. It behoves all of us members to lose no chance of doing what we can in the same direction, whenever occasion occurs—only by repetition and reiteration are such things driven home; for when the general public has been brought to recognise the importance of chemical industry and its development through research, the idea will be forced upon our politicians, and we may hope to have national support for chemical teaching and research on a scale more or less commensurate with their value to the nation.

The New President

The PRESIDENT said he had great pleasure in announcing that Mr. Edwin Thompson had been elected president for the coming year. Mr. Thompson had given to the Society a great deal of service and would be in the position during the coming year of giving still abler service.

Alderman EDWIN THOMPSON said it was difficult for him to say how greatly he appreciated the honour that had been done him in electing him president. It would be a foolish President-elect who would say anything of his hopes and aspirations in such a position and therefore he would say nothing about that, but he could claim to know something about the Society and what it stood for because he had had about 15 years' service on the council, and he could only say that he would do his level best to further the interests of the Society during his year of office. He could only hope that this time next year it would be possible for them to say, one to the other, "He has not done so badly." If that were so, he would be fully satisfied.

The election of vice-presidents was announced as follows:—Mr. W. A. S. Calder; Dr. W. Cullen; Dr. J. T. Dunn (retiring president); and Prof. F. M. G. Johnson (Chairman of the Canadian Section). The members of Council elected were:—Dr. H. Levinstein; Mr. E. Gabriel Jones; Mr. H. Talbot and Dr. W. M. Cumming.

On the motion of the president, a vote of thanks was accorded to the retiring chairmen of the Sections and members of committees for their work during the past year.

Dr. R. H. PICKARD, F.R.S., proposing a vote of thanks to Dr. Dunn for his work during the past year and also for his presidential address, said that during the year Dr. Dunn had set an example to younger men in physical energy in coming to London twice a month and presiding over the meetings with a skill and equinamity which was envied by some of them. The presidential address had given some reminiscences but they had not been tedious; indeed, they had been tinged with flashes of wit in a manner which had made the whole meeting go with a swing.

The vote of thanks was given with enthusiasm.

The PRESIDENT, acknowledging the vote of thanks, said his year of office, although a strenuous one, had been a pleasure and a delight.

Luncheon at the City Hall

Subsequently, a luncheon was given by the South Wales Section of the Society in the City Hall. The chair was taken by Mr. C. M. W. Grieb, chairman of the Section, and among those present were the Deputy Lord Mayor of Cardiff and the Lady Mayoress.

The only toast was that of "The South Wales Section" and it was proposed by the president, who recalled that as representing the oldest Section of the Society—because the Newcastle Chemical Society, which afterwards became the Newcastle Section—was in existence before the Society itself—he was proposing the health of the youngest Section of the Society. In that connection he remarked that although at one time Cardiff was allied with Bristol as the Bristol and South Wales Section, it soon became large enough to be a Section by itself, and did so in 1921. Since that time it had pursued a vigorous policy and the papers and proceedings showed that it was well able to hold its own with any of the other Sections. In wishing the section every success, the president expressed the appreciation of all those attending the meeting of the way they had been received.

The CHAIRMAN, responding, said that as the youngest Section of the Society they had had some diffidence in asking the Society to hold its annual meeting in South Wales, and he expressed the hope that everybody was enjoying themselves as much as was the case at other meetings. To a certain extent the Cardiff Section was an exceptional one in that it had two sub-sections, one at Cardiff and one in Swansea, and that made the Section a difficult one to run. The two places were about 45 miles apart and therefore it was rarely possible to have joint meetings. For the same reason the work of arranging this meeting of the Society had been difficult, and great credit was due to Dr. Rudge and Mr. G. Madel for what they had done. The brunt of the work had fallen on Dr. Rudge, who was a born organiser, but he had been ably supported by Mr. Madel, who had charge of the Swansea sub-section. Another feature was that in South Wales there were really no purely chemical industries and it was therefore with greater pleasure that he acknowledged the support that had been received from industries that were not purely chemical, in the way of contributions, with the object of making this meeting a thorough success.

Professor WILSON, of Glasgow, extended a cordial welcome to the Society to hold its annual meeting in Glasgow in 1935.

WEDNESDAY'S programme comprised a whole day's excursion to Swansea and the Gower Coast. Several members en route visited the Llandarsy oil refineries of the Anglo-Persian Oil Co. and the Mond Nickel Works at Clydach, the party re-uniting at Swansea for luncheon at the invitation of the Mayor and Corporation of Swansea.

A Civic Luncheon at Swansea

Sir John Cadman on the Depression

THREE parties of members of the Society of Chemical Industry left Cardiff by motor coaches on Wednesday morning—one to visit the Llandarcy oil refineries of the Anglo-Persian Oil Co., the second to visit the Mond Nickel Works at Clydach, and the third for a short pleasure excursion—and re-united for luncheon at the Patti Pavilion, Swansea, as guests of the Mayor and Corporation of Swansea.

Alderman E. HARRIS, Mayor of Swansea, proposed the toast of the Society of Chemical Industry, and extended to the members a cordial welcome to the county borough, tinged with a degree of regret that they could not see their way to make Swansea the headquarters for the annual meeting. After the advent of the copper and tinplate industries, he said, Swansea became known as the metallurgical centre of the United Kingdom, if not of the world. It might not hold that position to-day, but that was largely due to the depredations caused by such new processes as those for which the Society took credit. Apart from the metallurgical industries, Swansea had extensive activities in the chemical industry, and to-day it was fortunate in having the Mond Nickel Works at Clydach, which was affording a large amount of employment in the district, and the great oil refineries at Llandarcy run by the petroleum trade. The past 50 years had been a period of great change of commerce—a period coinciding almost exactly with the life of the Society of Chemical Industry.

Dr. J. T. DUNN, president of the Society, in responding to the toast, said the Society existed for the advancement of chemical science and industry, and its half-century's history showed that it had eminently succeeded in that respect. It had been suggested that it was through the efforts of the Society Swansea had ceased to be pre-eminent in the metallurgical industries, but it was through the efforts of the chemist that it had gained the two large industries to which the Mayor had referred. He also pointed out that the discoverer or inventor of the Mond process, the late Dr. Ludwig Mond, was president of the Society some years ago, while Sir John Cadman, who was closely connected with the development of the petroleum industry, was likely to be president within the next few years

A Chemically-Minded Town

Sir JOHN CADMAN proposed the toast of the town and trade of Swansea. The town, he said, was a most suitable place of assembly for the annual gathering of the Society of Chemical Industry. It was a very chemically-minded town. The non-ferrous industrialists of Swansea were the forerunners of the modern industrial chemist; and the tradition which they founded was carried on to-day. There was, for instance, the steel and tinplate industry, which relied more and more on scientific chemical processes. There was also the Mond Nickel Company, whose chemical principles were the backbone of its operations. Finally, there was the oil industry, represented by National Oil Refineries, a subsidiary of the Anglo-Persian Oil Co., which was constantly seeking for and applying new chemical processes. In addition to a high standing as a point of interest to the chemical world, Swansea had other attributes. It had, for example, the distinction of being both an industrial and a shipping centre. Its industrial operations had their origin in the smelting and refining of non-ferrous metals. Owing to changed circumstances, little smelting and refining were done to-day, but their place had been taken by the tinplate and steel industries.

The tinplate industry, unfortunately, had laboured under considerable difficulties for several years. The difficulties had various root causes. Monetary troubles and financial instability abroad had raised obstacles in the way of international trade. In a more serious degree, however, the tinplate industry had been affected by competition from other countries. In Germany, France, Italy, India and Japan, new tinplate mills had been erected and were being worked under cheap labour conditions. The result was low costs, price undercutting and the loss of many markets to the industry of South Wales. There was also another difficulty. It had been said that the tinplate industry of South Wales had not taken full advantage of the available developments in technique and production. Very little money, it appeared, has been devoted to research and process improvement. Whether that was true or not he was unable to say, but, whatever the fact might be, he hoped that the assembly there of many noted chemists would stimulate the industry to take advantage of the skill and knowledge which were to be found among the members of the Society.

The anthracite section of the coal industry was now enjoying increased prosperity largely as a result of the Ottawa agreements. Production and export of anthracite from Swansea had been, he believed, consistently good. As far as steam coal was concerned, however, there had been considerable reduction in the quantities mined and exported. Many foreign countries which formerly dealt to a large extent with Swansea now supplied their own requirements so far as possible and avoided the purchase of imported fuel.

Prosperous Local Industries

The diversity of interests and trades centred in Swansea had spared the town from experiencing the worst effects of the recent depression. Something of what was lost on the swings had been gained on the roundabouts and the net result in loss of trade—although regrettable—had lacked that intense severity which had been experienced by towns in other parts of Great Britain. Indeed, when one looked at Swansea and examined its projected civic activities and its finances, one was compelled to think that Swansea must be very prosperous.

Mr. LEWIS JONES, M.P., responding to the toast, said Swansea was an important place not only because of the industries within its own borders, but because it was the centre of a very extensive industrial area. Research work was going on in the area day by day in the iron and steel trade and the tinplate industry, by collective action, was also doing magnificent work, and both were generously supporting educational work that was proceeding in the University of Swansea.

Alderman W. D. REES, deputy Mayor of Swansea, also responded. For 250 years, he said, the industries of Swansea had been closely identified with the chemical industry. Some of its earlier industries had died, but there was plenty of room for the development of new industries, particularly the extraction of oil from coal.

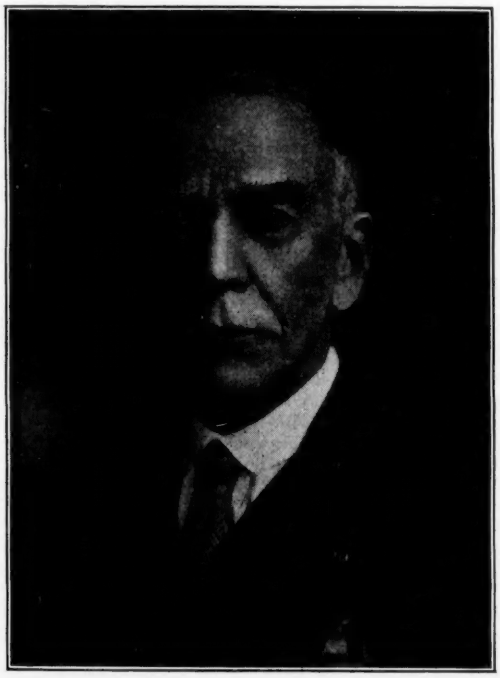
Following the luncheon, the members proceeded to Langland Bay, where bathing and other seaside attractions were enjoyed. Before the return journey to Cardiff there was an informal dinner at the Langland Bay Hotel. The whole of Wednesday's programme was arranged by the Swansea portion of the South Wales Section, the secretarial duties being carried out by Mr. G. Madel.

Previous Annual Meetings of the S.C.I.

THIS is the first occasion on which the Society of Chemical Industry has visited South Wales for its annual meeting. The records of the Society show that previous annual meetings have been held as follows:—London (twelve times), 1881, 1883, 1885, 1889, 1892, 1896, 1900, 1905, 1909, 1919, 1926 and 1931; Manchester (six times), 1882, 1887, 1897, 1906, 1915 and 1929, Newcastle-on-Tyne (five times), 1884, 1899, 1908, 1920 and 1933; Liverpool (five times), 1886, 1893, 1902, 1913 and 1924; Glasgow (four times), 1888, 1901, 1910 and 1922; Nottingham (four times), 1890, 1898, 1914 and 1932; Birmingham (four times), 1891, 1907, 1917 and 1930; Edinburgh (three times), 1894, 1916 and 1927; New York (three times), 1904, 1912 and 1928; Leeds (twice), 1895 and 1925; and once each at the following towns: Bradford (1903), Sheffield (1911), Bristol (1918), Montreal (1921) and Cambridge (1923).

Presidents—Past and Present

DR. J. T. DUNN, F.I.C., of Newcastle-upon-Tyne, whose year of office as president of the Society of Chemical Industry has just terminated, has had a unique scientific activity. He has brought to the Society the academic knowledge of a student and a teacher, combined with the practical ability born of a long association with the commercial and official aspects of chemical work. Born in 1858, Dr. Dunn graduated from the College of Physical Science, now Armstrong College, Newcastle, in 1877. From that year until 1882 he was first Pemberton Fellow of the University and demonstrator in chemistry and physics. In 1883 he became science master of Gateshead School, and after only three years in that capacity he was appointed headmaster.



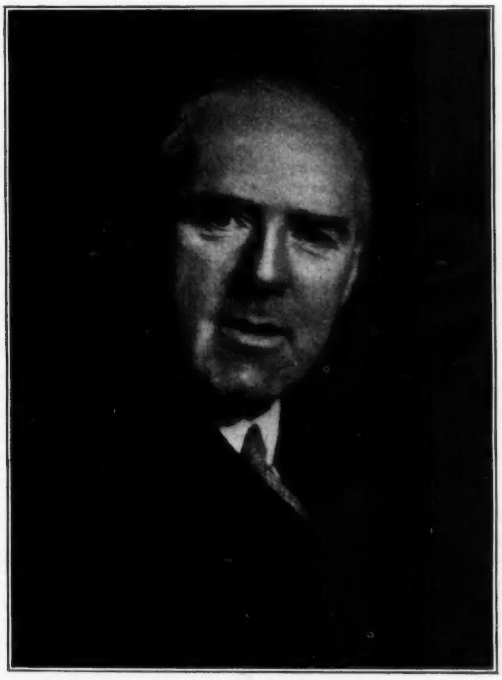
Dr. J. T. Dunn, J.P. (Newcastle-on-Tyne), President of the Society of Chemical Industry, 1933-1934, who delivered his presidential address at Cardiff on Tuesday

Leaving Newcastle in 1894 he was in turn head of Plymouth Technical School and principal of the Northern Polytechnic, Holloway Road, London, where he superintended the erection of the building, appointed the original staff and arranged the the equipment and curricula. He remained in the south until 1901, when he returned to his native town to join, as partner, the firm of J. and H. S. Pattinson and Co., consulting and analytical chemists. In 1912 he became sole principal of the firm on the death of Mr. John Pattinson. In the same year he was appointed public analyst for the county of Northumberland, Newcastle, Gateshead, Sunderland, South Shields, Tynemouth and Berwick, an office which he still holds.

It was Dr. Dunn, then hon. secretary and editor of the Transactions of the Newcastle Chemical Society, who took a great part in the negotiations which culminated in the amalgamation of that body with the Society of Chemcal Industry in 1883. He has twice been chairman of the Newcastle Section of the Society, also a member of the council and, before his election to the presidency, a vice-president. Dr. Dunn was president of the Society of Public Analysts in 1930-1932 and is a member of the council of that organisation. Among his many activities, Dr. Dunn has taken part in the work of committee on arsenical poisoning which was appointed in consequence of the arsenic scare in 1901, and he has served on committees of the British Association, the Fuel Research Board, and the British Standards Institution. A member of the council of Armstrong College, vice-president of the Newcastle Literary and Philosophical Society, Dr. Dunn is a Justice of the Peace for the county borough of Gateshead-on-Tyne.

Alderman Edwin Thompson Succeeds Dr. J. T. Dunn

BY electing Alderman Edwin Thompson, J.P. of Liverpool, as its president for the year 1934-1935, the Society of Chemical Industry has chosen a distinguished representative of industry, as distinct from the academic side. Alderman Thompson is governing director of Thompson and Capper Wholesale, Ltd., of Manesty Buildings, Liverpool, manufacturers of chemical and pharmaceutical machinery, particularly water distillation apparatus (the Stokes Manesty automatic water stills), compressing machines for chemicals, foodstuffs and synthetic resins, etc. He is a cousin of the late Professor Sylvanus Thompson and a nephew of one of the original members of the Society of Chemical Industry, the late W. P. Thompson, patent agent. For many years he was



Alderman Edwin Thompson (Liverpool), who was elected President at the annual meeting of the Society of Chemical Industry at Cardiff on Tuesday

associated with Dr. Alfred Holt, in Holt, Thompson and Co., Ltd., in the manufacture of fine chemicals, particularly salicylates.

From 1923 to 1925 Alderman Thompson was chairman of the Liverpool Section of the Society of Chemical Industry—one of the oldest branches of the Society—and in 1923 he discharged the onerous duties of hon. local secretary for the British Association for the Advancement of Science meeting, held that year in Liverpool. He was Lord Mayor of Liverpool in 1930-1931, and in the latter year he was the first English Lord Mayor to pay an official visit to New York and Washington. During his mayoralty, Alderman Thompson was founder and originator of the idea which led to the formation of the Lancashire Industrial Development Council. He was president of the British Waterworks Association in 1930 and is chairman of the Liverpool Water Committee and vice-chairman of the Liverpool Repertory Theatre. He is a member of the general committee of the British Association.

For two separate periods of three years, Alderman Thompson has been a vice-president of the Society of Chemical Industry, and he has twice been a member of the council for a similar period.

Plasticity, the Servant of Industry

Professor Freundlich Explains Some Phenomena

PROFESSOR H. FREUNDLICH, who is the world's greatest authority on plastic materials, addressed the Society on Thursday, his subject being "Plasticity, the Servant of Industry." At present, Professor Freundlich is a guest-professor at University College, London, having been forced to leave Germany following the introduction of the Hitler regime. Before settling down in England he was a professor at Berlin University and at the Technical College, Berlin.

We speak of plasticity, said Professor Freundlich, if a solid or a semi-solid mass like moist clay can be more or less easily deformed by mechanical force without losing its coherence and without the mass showing any marked tendency to resume its original shape. In contrast, a brittle body, under stress, loses coherence, whilst an elastic one, when deformed, resumes its original shape. There are many materials and systems which are plastic: pure metals and their alloys; substances like guttapercha or butter; masses made up of both liquid and solid particles such as moist clay, chocolate, concentrated rubber latex, and many artificial materials. It seems fairly certain that the root cause of the plastic behaviour is not the same in all these cases, and thus it is necessary to to distinguish between molecular and colloidal plasticity, although the latter term is not strictly correct.

Structural Plasticity

On shaping a piece of metal by working, we make use of its plasticity. This plasticity of metals is generally considered to be a truly molecular plasticity, caused by the deformation of the space lattice of the single crystals. Common metallic objects are all polycrystal line, consisting of a very great number of very small irregularly formed and distributed crystals, but in recent years it has been possible to produce large single crystals of metals, which also prove to be plastic. Whilst it is difficult to conceive of any other explanation of plasticity than a deformation of the space lattice of the single crystal, this explanation is not so evident in the case of polycrystalline metals. Consequently, there are still some investigators who prefer to assume that malleable metals contain a certain proportion of extremely fine, colloidal particles, which promote plasticity just as does the fluid component in the many cases of colloidal plasticity.

The plasticity of polycrystalline metals is frequently characterised by the pressure which causes the metal to flow through a small orifice. Soft and plastic metals have a low flow-pressure and *vice versa*. Also, it has been found that pure metals show higher plasticity than their alloys, the flow-pressure increasing as soon as the pure metal is alloyed with another one. This is even true if the second metal is more plastic than the first one, as may be seen by adding indium or thallium to lead. It is also a well-known and remarkable fact that the elastic and magnetic properties of metals are closely correlated with their plasticity; the electrical conductivity of the alloys of lead and indium, for instance, has a minimum where the flow-pressure is at its maximum.

Non-Isothermal Plasticity

Glass is the prototype of an amorphous substance, and its behaviour under certain conditions agrees with our definition of plasticity: it is more or less easily deformed by mechanical force without loss of coherence and without any marked tendency to resume its original shape. But the main point is that in use it is deformed at high temperatures, where it behaves simply as a deformable liquid, and it is prevented from resuming its original shape by quick cooling. At temperatures just below the point where it becomes liquid, it is plastic and deformable in the ordinary sense of the word, the very high temperature coefficient of viscosity allowing this to be done without difficulty. We have with glass, so to speak, a non-isothermal plasticity. At ordinary temperatures we would not be inclined to call glass plastic; it is hard and brittle, but only if the forces try to deform the glass quicker than its viscosity allows; if sufficiently small forces are applied sufficiently slowly, glass is a plastic substance at low temperatures too, but having a very high viscosity.

Resins are gels of highly polymerised organic substances, the disperse phase consisting of a more highly polymerised form of the material composing the continuous phase. Their plastic behaviour is exactly parallel to that of glasses; the temperature coefficient of viscosity has a similar trend; at certain temperatures, the resins are plastic and easily deformable whilst at lower temperatures they are hard and brittle, except when small forces are applied over a long time, under which conditions resins remain plastic. It seems probable therefore that the plastic behaviour of resins and glasses is determined mainly by the viscosity of the continuous phase, the medium, whilst the disperse phase is only of secondary importance.

Other materials closely related in their plastic behaviour are guttapercha, balata, and also indiarubber. Guttapercha is made easily deformable by gentle heating, in which state it is excellent for reproducing fine structures and patterns without adhering to the walls of the mould after cooling to normal temperature. Uncured indiarubber behaves similarly, but owing to its stickiness, as well as for other reasons, it cannot be used for moulding, and nearly all articles made of indiarubber are vulcanised, which transforms the rubber from a plastic and sticky state into a highly elastic one. Like the resins, these materials are also gels—two-phase colloidal systems of highly polymerised organic substances—but their structure is distinctly different from that of the resins. Whereas the resins generally do not contain long-chain molecules, tending to form crystals, indiarubber does contain such molecules, most likely of a spiral structure, which tend to form layers of oriental crystals, when the indiarubber is stretched or compressed. This effect is shown by the X-ray diagram of indiarubber, which when unstretched shows a normal amorphous diagram and when stretched shows a spot diagram, as if filled with oriental crystals.

Colloidal Plasticity

Plastic masses containing water or acqueous solutions—the ceramic masses—are considered to show true colloidal plasticity, although they are not colloidal systems in the strict sense of the word as the solid particles they contain are larger than ultramicroscopic in size. Moist clay is the most common example of this kind.

At first sight the behaviour of such a plastic mass as clay

seems capable of simple explanation—the mass is easily deformed like the liquid in it, the latter acting as a lubricant between the solid particles, whilst the fact that these small solid particles are united only by very thin liquid layers gives the whole mass a certain rigidity and structure. But if we inquire more deeply into the question of colloidal plasticity, it turns out to be full of intricacies. Firstly, a plastic mass cannot be made with any powder and any liquid; only when a number of special conditions are fulfilled does the plastic condition develop. Secondly, colloidal plasticity is closely associated with the phenomena shown by some plastic masses of being amenable to the so-called clay-casting process, and of giving hard, coherent masses on drying.

There is no doubt that there must be some affinity between the solid particles and the liquid, the former being easily wetted by the latter. Solid dry clay gives plastic masses with fluids like water, the alcohols and the acids (lactic acid being specially effective), but not with hydrocarbons like petroleum, benzene, etc.; amino- and nitro-compounds, etc., give poorly plastic masses. Thus the fluids giving plastic masses all contain active hydrogen atoms and may be considered to be able to react with the alumino-silicates of the clay.

Perhaps even more impressive than these experiments is a comparison of the behaviour of clay with that of bentonite. Bentonite is a clay-like substance produced from dust of volcanic origin, especially found in the United States. It is the only inorganic substance so far known which is able to swell in water, aqueous solutions, glycerin, and alcohol. It forms true gels, the bentonite particles being of colloidal size, and yet, although gels, generally speaking, do not of themselves form plastic masses of real colloidal plasticity, one reason being that their consistency is not great enough, the addition of a few per cent. of bentonite will greatly enhance the plastic properties of a poorly plastic clay.

A Study of Bentonite

The X-ray spectrum of bentonite is a so-called layer spectrum, *i.e.*, it consists of parallel layers, each layer having in its turn the same structure, but it is not clear whether the space lattice of each layer consists only of silicon, aluminium, oxygen, and hydrogen atoms, or whether it contains also calcium and magnesium atoms. As the bentonite is allowed to swell, the changes in the X-ray diagram show that the distance between the layers grows continuously and reversibly, whilst the internal constitution of each single layer is not changed at all, that is, the water molecules are attracted to the surface of the layers, pushing the layers asunder and separating them at last into single particles. The strength of the attraction between the surface of these layers and water depends very markedly on the amount of exchangeable CaO(MgO) contained in the layers; swelling increases with increasing amounts of these exchangeable bases.

The space lattice of kaolinite—the substance which is considered to be the main constituent of clay—is in some respects similar to that of bentonite, in that it shows respects similar to that of bentonite, in hat it shows a layer spectrum, but the structure of the layers is different. In bentonite both sides of a layer seem to have the same constitution, and, as the distance between layers is fairly great, the attraction between one layer and the next is not very strong. In kaolinite, on the other hand, the attraction between the layers (which seem to consist of chains of O—Al—O—Si—O...) is so strong that the water molecules are not able to overcome these forces, penetrate into the particles of kaolinite and cause swelling; but the water molecules are attracted to the surface of the particles and bound there. This is most important for the plastic behaviour of clay, the particles remaining large enough to maintain the consistency characteristic for plastic masses. The behaviour of both kaolinite and of bentonite seems to prove the fact that some affinity between the solid and liquid is essential for the development of plasticity.

The Osborne Reynolds Effect

Too close a packing causes a phenomenon which is detrimental to plasticity. It is a well-known phenomenon which was explained first by Osborne Reynolds. If you walk on the moist sand of a beach, you may observe that it turns dry just under your foot, yet becomes moist again as soon as you lift your foot. The same behaviour is frequently found with other moist fine powders; if you press or stir them, they become dry and hard; as soon as you withhold the mechanical force, the water exudes slowly and the mass becomes moist again. Explaining this Reynolds said that in the moist sand the particles are closely packed; on applying mechanical forces they are dislocated, and for this reason the packing becomes looser; the interstices between the particles are therefore enlarged, and so the amount of liquid originally present is not sufficient to fill them and the mass appears to be dry. Left to themselves, the particles assume their original position of equilibrium, a close packing, and the amount of liquid is again large enough to fill the interstices; the whole mass is moist again. Now it is obvious that, if the packing is so close that we have the Reynolds phenomenon, the plasticity must be poor, for on deforming the mass, it would become hard and brittle, that is to say, it would lose its plastic behaviour. So it is essential that plastic masses are not too closely packed; they must have fairly thick layers of liquid around the particles.

Thixotropy

There is another phenomenon—that of thixotropy— which requires a loose packing in solid/liquid systems and is therefore frequently met with in plastic masses. A material is said to be thixotropic if when at rest it becomes solid but liquifies again on shaking, the processes of solidification and liquefaction being reversible and capable of being repeated at will. This phenomenon also needs a sufficient thickness of the liquid layers between the particles: it is found in loosely packed systems of clay or bentonite and water but not in closely packed ones like quartz powder and water. Thixotropy further demands attractive forces between the solid particles, and such attractive forces are also instrumental in promoting the consistency of plastic masses.

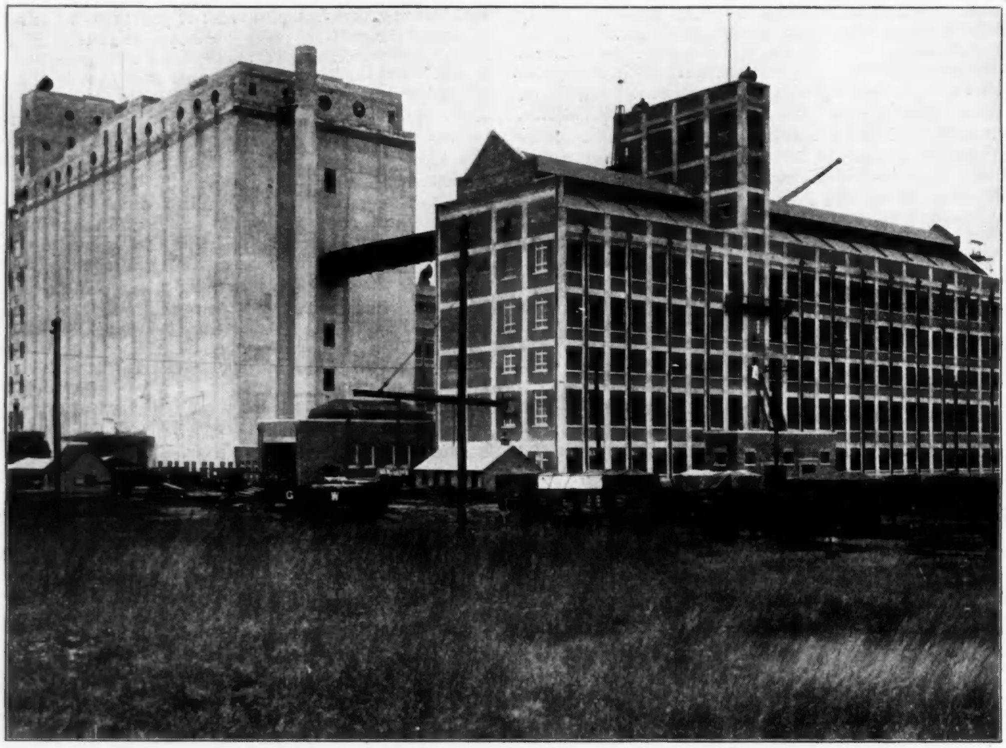
Particle size as well as shape has a characteristic influence on plasticity, and the effect of size is modified by shape. To form plastic masses, there seems to be a distinct optimum in particle size lying between 0.3 and 3μ, but if the particles are too small, of truly colloidal size, the influence of the non-spherical shape, so valuable for the cohesion of the mass, decreases markedly. The stronger Brownian movement of smaller particles also causes the whole mass to be less firm, and the interior surfaces between the two phases on which cohesion depends are smaller in area and irregular.

Plastic Masses and Gel Formation

In many cases of colloidal plasticity the plastic behaviour of a mass is correlated with other properties, notably that of giving, when dried, hard coherent masses without cracks. Thus the term "plasticity" is often used technically in a broader sense, it being taken for granted that such behaviour belongs necessarily to a truly plastic mass. A casual connection between these two phenomena is evident. If a mass is truly plastic and easily deformable, the component particles will also easily comply with the deformations caused by the gradual removal of the liquid on drying. Furthermore, as the liquid layer on the surface of the particles is very firmly bound, it may even have the character of a colloidal solution. It is therefore very likely that these surface layers, on drying, coalesce and give coherent layers of a gel. Thus, the important characteristic for plastic behaviour in all respects is the affinity between solid and liquid component.

The expected simultaneous development of thixotropy with plasticity is found in quite a number of cases of technical importance and is made use of for moulding plastic masses. Rubber latex has become so valuable as a raw material, not because it has substituted crêpe or sheet rubber, as was expected at first, but because it has its own merits. By mixing latex or concentrated latex preparation like Revertex with suitable substances, for instance bentonite, plastic masses are made which are thixotropic. Liquefied by stirring, the mass is poured into the mould; it solidifies when left to itself, without any change of volume and having filled out even the most intricate patterns of the mould.

Portland cement and concrete are aqueous plastic systems which owe their excellent mechanical properties in part, presumably, to the same causes; the water acting on the particles produces a gel—that is why the mass is temporarily plastic—and this gell forms layers of cement, uniting the particles as far as they have not yet been dissolved.



The New Flour Mills of Spillers Ltd., Cardiff.

South Wales Industries

A Look Round Cardiff and District

CARDIFF has many claims as one of the most important centres of the chemical and allied industries in the United Kingdom, and has had a good deal to show to its visitors this week in addition to the formal works visits included in the Society's programme. Its iron and steel works occupy an area of ninety acres and produce pig iron, steel ship plates, boiler plates and tubes for all parts of the world. It has one of the largest paper making mills and one of the largest steel pipe works in the country, and an up-to-date oxygen factory. Cardiff docks offer superior accommodation and facilities, with direct rail connections from the dockside, to deal advantageously and economically with imports and exports of all kinds. The water area of the docks is 165 acres, dock quayage 37,630 ft., cold storage capacity 1,152,000 cu. ft., and there are 26 transit sheds and warehouses, 14 dry docks and 127 cranes. The industries of Cardiff include animal foods, aluminium and phosphor bronze castings, antiseptic products, asbestos, belting, brick and tile works, copper smelting, cement and lime, confectionery, chemicals, concrete products, chromium and electric plating, fertilisers, graphite oils and greases, iron and steel, mineral waters, milling, oil refining, paper making, patent fuel, polishes, refrigeration plant, tin plate, tar distillation and toilet preparations. The report compiled by the Cardiff District of the Shipping Federation on March 31 last showed that there were 54 firms of shipowners owning 202 vessels of about 768,000 deadweight, so that Cardiff still occupies a very important place in the shipping trade of the world, but twelve years ago, nearly 500 vessels were owned or controlled by firms whose principal offices were at Cardiff.

Modern Flour Milling

THE new flour mills of Spillers, Ltd., at Cardiff, are a notable example of industrial enterprise. The milling plant, which has a capacity of 100 sacks of flour per hour, is accommodated in an imposing five storeyed building of simple design, constructed of steel with concrete and brick panels. A general air of brightness is noticeable throughout the building and the inside decorations have been chosen with a view to ensuring cleanliness and an even diffusion of light. All floors are maple covered and the electric lighting is carried either in bulkhead fittings or the more usual pendant lights. Connection with the silo is provided at one end of the screenroom by means of a gantry. The screenroom building comprises six floors, and is separated from the mill by the rope race and the sprinkler tower. On the mill yard side, the dirty wheat and conditioning bins are arranged.

Wheat from the silo is delivered to the bins in the screenroom by means of a Redler conveyor. The bins are of timber with steel hoppers, the outlets being operated, through ratchets and slides, by chains from the basement floor. The wheat cleaning section consists of four separate plants, each with a capacity of 200 bushels per hour, and there are five dirty wheat bins to each plant. The wheat mixture can be divided into four groups of wheat of similar characteristics, each group passing to one of the cleaning plants, where it can be treated individually, and the conditioned wheat be given the moisture content which best suits the constituents of the group. Further, this moisture content is so arranged that the average moisture of the wheat of the four groups, when mixed together, will be that required for milling purposes. The accurate control of moisture content secured in this way is a valuable feature of the plant and assists materially in securing regular and consistent products.

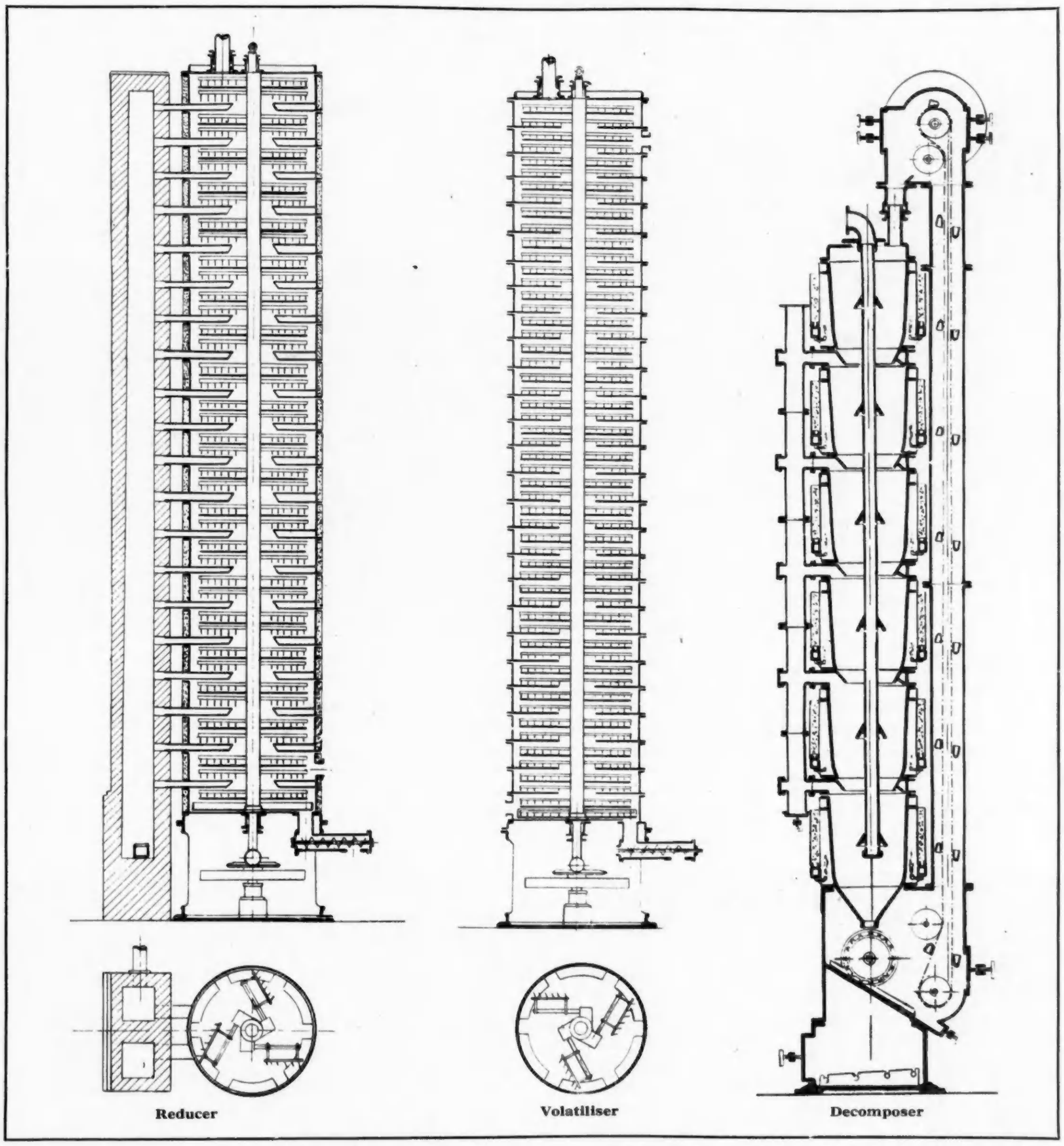
Iron barrel scourers have been installed for dealing with smutty or very dirty wheat. After passing over a water-wheel damper, this wheat is treated on a Reform combined washer, stoner and whizzer, then to a Reform 25-quarter conditioner and to conditioning bins, which have a storage capacity of 3,800 quarters. From the conditioning bins, the wheat is mixed

through a line of measurers and then goes as one stream of 800 bushels through the remainder of the wheat cleaning plant. The blended wheat is delivered to a cross worm conveyor in the basement feeding an elevator which, in turn, feeds a dividing hopper on the lattice floor at the top of the building where the 800 bushel stream is divided into four and is sent to four Duo-aspirators for the extraction of light impurities and beeswing. After treatment on these machines, the wheat passes over magnets to four large-sized emery scourers, and then over a new type 800-bushel Simon water-wheel damper to the grinding bins.

The mill elevators are set on concrete footings for easier access for cleaning and inspection and are arranged along the centre of the building with machinery on both sides and, as the stancheons carrying the floors are also down the centre, the floors are open and free from obstruction. The fact that the various floors are lofty has enabled the mill designers to place conveyors, exhaust trunking, shafting, etc., well up out of the way, a point which has added considerably to the appearance. All machines are set well back from the walls, giving wide gangways, and ample walkways have also been provided between individual machines. Guarding of the machines is carried out in bright steel tubing.

A feature which attracted the attention of those inspecting this plant is the water-cooling of the rolls. By means of water cooling, it is possible to maintain the roll temperature at a very low figure. Further, condensation is avoided and the stocks remain cold throughout the milling process. Water is introduced into the hollow interior or the roll by means of a stationary water inlet pipe, which passes through the bored spindle at one end, and discharges the water at a point near to the opposite end of the roll. The water is introduced at the gear box end of the upper half roll and at the end opposite the gear box of the lower roll. The water fills the hollow roll until it reaches the level of the hole in the spindle, overflows and passes out between the inlet pipe and the inner surface of the bored spindle.

The second floor of the mill is mainly occupied by the puri-



Cross Section of Reducer, Volatiliser and Decomposer, used in the Extraction of Nickel by the Mond Carbonyl Process.

fiers. A line of roller mills on fourth break stocks and wheatfeed grinding, and the filter dust collectors on the purifier exhaust are also accommodated on this floor. Other purifiers have been installed on the third floor on one side of the elevators; with centrifugals, arranged two-high, and reels on the other side. A number of suction filter dust collectors have also been placed on this floor. The fourth or top floor is provided with two lattice floors giving access to the elevator heads and the feed dividing hoppers. Approximately half the floor on one side is devoted to the plansifters and the other half to centrifugals. The centrifugals are, in most instances, placed two-high with an occasional three-high group.

The whole plant is electrically driven; altogether some 150 motors, totalling 3,500 h.p., have been installed to provide the motive power for the various sections. The electrical supply is received from the Cardiff Corporation at 6,600 volts 3 phase 50 cycles and transformed down to the required voltage. The mill and screenroom are driven by a single 1,300 b.h.p. motor and stop buttons are provided on each floor in case of emergency. The drive is by ropes, the rope race being arranged immediately behind the motor house.

Nickel Refining by the Carbonyl Process

AT the Clydach Works of the Mond Nickel Co., Ltd., the process of refining converter matter, obtained in the smelting of nickel ores in Canada, was of outstanding interest to chemical engineers and metallurgists. The Mond carbonyl process, which is used at this refinery, is based on discoveries made by Dr. Ludwig Mond, Dr. Carl Langer and Dr. H. Hirtz in 1890. The process consists essentially of (*a*) calcining the ground matte to produce metallic oxides, (*b*) leaching out the copper, (*c*) reducing the remaining nickel oxide to an impure nickel by water gas, (*d*) reacting on the nickel with carbon monoxide to form gaseous nickel carbonyl, and (*e*) decomposing the nickel carbonyl by heat at 200° C, when nickel and regenerated carbon monoxide are the resulting products.

The matte which contains about 80 per cent. of metal is ground in ball mills to 60 mesh and conveyed to calciners. Calcination consists in heating the matte in the presence of air in order to oxidise the sulphur and remove it as sulphur dioxide. The maximum temperature is about 780° C. The heat necessary for calcination is supplied from producer gas burners. If calcination is carried out to completion, that is, if the sulphur content is reduced to a minimum, the product is ground up and leached with 12 per cent. sulphuric acid at 70° to 80° C., whereby most of the copper is dissolved. On the other hand, calcination may not be carried as far as this stage, in which case the product contains copper sulphate, which is leached out with water.

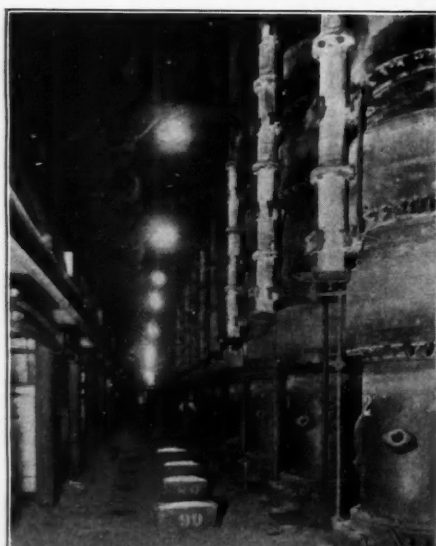
The "copper extracted matte" is now filtered and dried, and passes to the reducers, in which about 85 per cent. of the oxides are reduced by water-gas containing approximately 60 per cent. hydrogen and 36 per cent. carbon monoxide to give finely divided crude nickel. This reduced material is sent to volatilisers where, by acting on the reduced nickel with carbon monoxide, about 36 per cent. of the total nickel fed is volatilised as gaseous nickel carbonyl. The residual material is collected and passed through a further volatiliser, where 8 per cent. more of nickel is extracted. The residue is again made to pass through more reducers and volatilisers and finally discharged. The total time spent by the matte in the plant is about 6½ days.

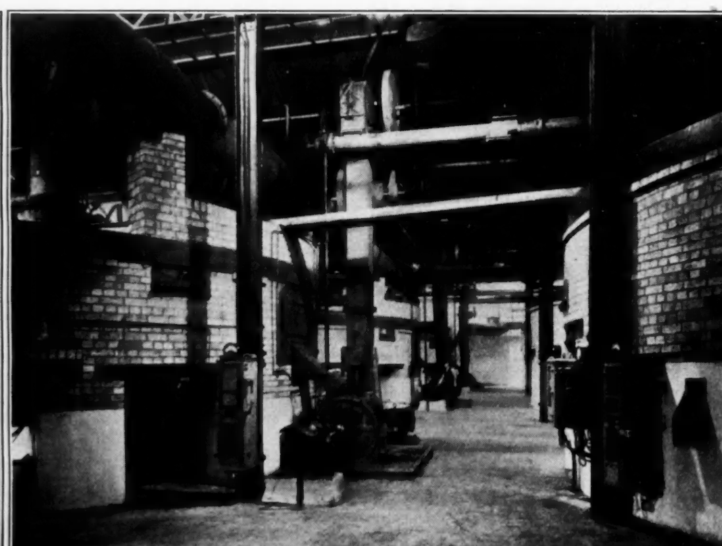
The reducers, one of which is illustrated diagrammatically, are vertical gas-tight chambers 6 ft. in diameter. They are divided into 21 horizontal sections each fitted with a rotating scraper. The matte is scraped from section to section, somewhat in the manner employed in a metallurgical roasting furnace. A reduction temperature of 330° to 350° C. is maintained by external gas-heated chambers. Water-gas is used for the reduction; it enters at the top and leaves at the bottom. The reduction is interesting in that it is accomplished at so low a temperature that the carbon monoxide effects only about 3 per cent. of the reduction, about 97 per cent. being due to hydrogen; consequently, the exit gas is very rich in CO, and this is suitable for the formation of the nickel carbonyl in the volatilisers.

The volatilisers are similar in construction to the reducers, no heating, however, being necessary. The reaction $Ni + CO \rightarrow Ni(CO)_4$ is exothermic and the heat evolved is dissipated by radiation and conduction to maintain a temperature of about 50° C.

The average carbonyl content of the gas passed to the decomposers is about 2 per cent. In the decomposing apparatus it comes in contact with nickel pellets heated to a temperature of about 180° C. This causes the dissociation of the carbonyl, nickel being deposited on the pellets and carbon monoxide being liberated. Close temperature control is necessary since, at 200° C., the carbon monoxide is liable to break down into carbon and carbon dioxide.

The decomposers carry six cast-iron decomposer boxes, one

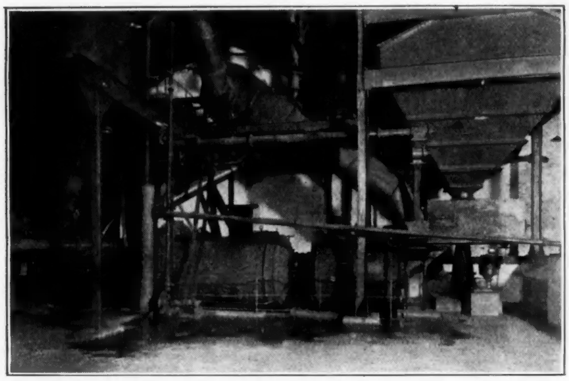




The Clydach Works of the Mond Nickel Co., Ltd. Left : Decomposers, showing inspection dead-lights and nickel draw-boxes. Right : General view of the Calciners.

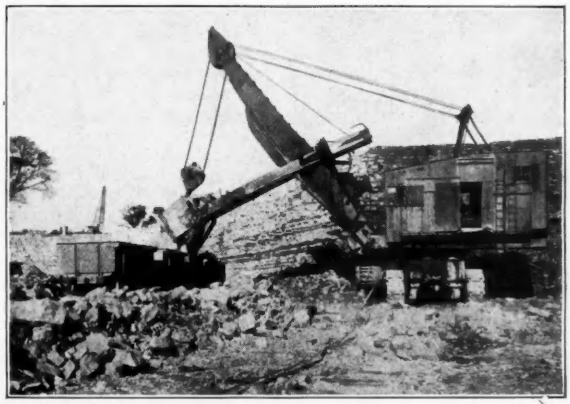
above the other, each box being externally heated by producer gas. They are filled with nickel pellets before being put in circuit and hold about 9 short tons. In order to prevent the pellets from cementing together with freshly deposited nickel, they are kept moving. This is effected by continuously withdrawing pellets at the bottom and recharging at the top by means of a bucket elevator. As the nickel is deposited so the pellets increase in size and the volume increases; some of the pellets overflow the top box, whence they are removed and screened, the small ones being returned to the decomposer. The finished pellets measure about 10 mm. diameter and it takes six or eight months to build up a pellet of this size. The gas containing the carbonyl percolates through the pellets, in which operation the carbonyl is decomposed into nickel, which is deposited, and carbon monoxide, the outgoing gas, is then recirculated through the volatilisers to form more carbonyl. Thus a closed circuit is formed, wastage in CO being made up from the residual gases from the reducing operation.

The residues from the volatilisers are resmelted and again



The Grinding Plant at the Clydach Works of the Mond Nickel Co., Ltd.

pass through the plant, this operation being repeated twice. The final residue is dried and shipped to a precious-metal refinery. The carbonyl process is quite unique in metallurgical operations since no other metal behaves like nickel in forming a volatile carbonyl under like conditions. The development of the process from a chance observation of



Large Electric Navvy at the quarry of the Aberthaw and Bristol Channel Portland Cement Co., Ltd.

the action of carbon monoxide on nickel is, indeed, a remarkable achievement in chemical engineering.

Cement Manufacture

AT the works of the Aberthaw and Bristol Channel Portland Cement Co., Ltd., East Aberthaw, apart from the general manufacture of cement and hydraulic lime, the principal matter of interest was the quarry, where limestone and shale is excavated by a large electric navvy moving on "caterpillars" and fitted with 4½ cu. yd. bucket working at a 45 ft. face. The current for this navvy is taken direct on to a Ward Leonard motor generating set at 3,300 volts, 50 cycles, 3-phase, the operating motors running at 250 volts d.c. The new asbestos-cement plant at the company's Rhoose Works was also inspected. Here all types of roofing materials, such as tiles and corrugated sheets, flat building sheets and high pressure pipes were seen in course of manufacture.

Oil Refining at Llandarcy

THE oil refinery of National Oil Refineries Ltd., at Llandarcy, was opened in 1922, and has been in continuous operation since that time, receiving crude oil from the wells of the Anglo-Persian Oil Co., Ltd., in Persia, via pipeline and tanker services, and distributing the finished products to the United Kingdom and certain adjacent foreign countries. Nearly 700 acres of land are occupied by the various jetties, pipelines, storage tanks and refinery equipment, while continuous employment is given to over 700 men. The receiving and handling of this crude throughout its various processes demands considerable tankage and pipelines, something like 750,000 tons of capacity and 70/100 miles of pipe having been provided for handling and storage.

The engineering problems involved in the storage and rapid movement into the refining plant of quantities of crude oil varying from 1,000 to 3,000 tons per day is of interest to chemical engineers. A number of interesting types of storage tanks with floating roofs were seen, together with the use of aluminium paint for reducing heat absorption. The type of pump chiefly used is a motor-driven direct coupled, multi-stage centrifugal pump of large capacity capable of pumping against considerable head up to 350 lb. per square inch. The power for these pumps is generated partly in a central power station equipped with three turbo-generators, each of 2,500 kilowatt, an adjacent boiler house providing steam at 180 lb. gauge pressure and 200° F. superheat, either total condensation, or the intermediate draw-off of process steam being possible. The power generated is 3,300 volt, three-phase, 50 cycle, and is distributed as such for the larger machinery, and as 440, 250 or 110 volt through transformers for special purposes. Power is also obtained from the South Wales grid, the completion of parts of which was specially expedited for the purpose.

A well staffed laboratory is kept for the continual testing, both during process and at the point of despatch, of the various products manufactured. A development branch of this laboratory is equipped for large scale experimental operations in connection with refining. In addition chemical plants manufacture lime water, and calcium hypochlorite by the solution of chlorine in lime water, and another plant manufactures pure liquid sulphur dioxide from raw sulphur.

The inflammable nature of all the material handled demands special precautions against fire; ample water service points at high pressure are provided throughout the area, and in addition, since water is of limited utility for fighting oil fires, chemical fire-fighting appliances are available in the shape of special tanks and mixing pumps to produce fire-fighting foam in large quantities.

In the distillation process the extent to which fuel economy is important may be gathered from the fact that many hundred tons a month of oil are burnt in the refinery, demanding circulating cooling water to deal with surplus heat amounting to 10,000,000 to 12,000,000 gallons pumped per day. The combustion of this fuel is accomplished in furnaces of various kinds ranging from the plain brick-box setting under a Lancashire boiler type of still to the very modern tubular boilers for steam raising. One of the furnaces has the interesting hot flue-gas circulating system in order to restrict heating mainly to convection heat, whilst a number of the more modern furnaces have a highly radiant flame and floor,

with special roof tubes to make full use of direct radiant heat. Coal and waste materials of various kinds are burnt in forced-draught cast iron grates or mechanical stokers, whilst oil burning by steam atomisation and direct pressure atomisation are features of other furnaces.

The condensing, cooling and heat exchanging equipment throughout the refinery ranges from simple cast iron pipes surrounded by a water box to the very complicated and efficient multi-stage tubular heat exchangers, having small diameter tubes of steel or bronze, arranged in bundles inside a steel or C.I. jacket. A considerable amount of heat is conserved by the use of heat exchangers whereby the cold stock being pumped into a unit is pre-heated by means of the various streams of hot products, vapour or liquid, leaving the unit. There are a large number of fractionating towers. The very large towers are used at absolute pressures of 10-50 mm.; most, however, work at a pressure of a few pounds gauge, while two work at pressures of 200 lb. gauge.

The problems of measurement presented by the handling of these large quantities of liquid, and the problems of control of the very delicate processes of fractionation is solved by the use of orifice meters and various control instruments with pilot mechanism operated by compressed air. Altogether, 300 to 400 meters and controllers are in operation throughout the refinery, demanding a special staff to attend to their maintenance and servicing.

The Llandarcy refinery provides an example of the application of science to industry comparable with the best practice to be found in America or elsewhere and, as well as being the largest, is one of the very few such works to be found in this country.

Tinplate Manufacture

TINPLATE manufacture is carried on at the works of the Melingriffith Co., Ltd., situated in pleasant surroundings at Whitchurch, near Cardiff. These works have a capacity of 500/600,000 basis boxes of tinplates per annum. They comprise 13 tinplate mills of which 5 are driven by water power, a double greys pickling machine, 2 tunnel annealing furnaces, 20 pairs of cold rolls, and 4 Thomas and Davies automatic pickling and tinning machines, with the usual auxiliary departments. The welfare of the employees of the works has always been carefully studied, and a Mutual Help Fund for the benefit of sick and aged employees has been established. A sports club with cricket, football, tennis, boxing and cross-country running sections, together with a well-equipped gymnasium, has been organised for the employees.

New British Chemical Standard

Aluminium Silicon Alloy "B"

THE increasing use of aluminium alloys high in silicon and the issue of A.I.D. and B.S.A. specifications for them has justified the demand for a standard analysed sample of this type. British Chemical Standards has for some time been supervising the preparation and analyses of a new sample which is now ready for issue. The standard turnings have been carefully analysed as usual by a number of experienced chemists representing the different interests which include independent analysts, a government department, manufacturers, and users including chemists in France, Czechoslovakia and Norway. The elements which are at present standardised are as follows:—Si 12.74 per cent., Fe 0.34 per cent., Mn 0.005 per cent., Zn 0.020 per cent., Ti 0.006 per cent., Cu 0.010 per cent. The standard figures for traces of other elements which are present may be issued and published subsequently.

To illustrate the great interest taken in this alloy by the co-operating chemists, the research laboratory of the British Aluminium Co., Ltd., has made no less than ninety determinations for silicon and fifty-seven determinations for iron by three independent operators. It is believed that this is the only standard of its kind issued in Great Britain, United States or the Continent, and it is therefore likely to be of international interest. The standard is issued at a price at which it is estimated it will eventually cover the cost, and may be obtained from Ridsdale and Co., 3 Wilson Street, Middlesbrough, or from any laboratory furnisher.

Manufacture of Lithopone

Judgment on Alleged Abuse of Monopoly Rights

IN the Chancery Division on July 11, Mr. Justice Luxmoore delivered his reserved judgment on a petition by I. G. Farbenindustrie and Orrs Zinc White, Ltd., in connection with an application by McKechnie Bros., London and Widnes, under section 27 of the Patent and Designs Acts, 1907-32, for a compulsory licence in respect of Patent No. 225,523, dated November 30, 1923, and granted to Farbenfabriken Vorm Frieder Bayer and Co., of Germany, for an invention for "improvements in the manufacture of lithopone." The I.G. were the registered legal owners of the patent and Orrs Zinc White were the licensees under it.

The Comptroller of Patents had granted a "licence of right" to McKechnie Bros. to manufacture on the ground that there had been an abuse of monopoly rights. From this the I.G. and Orrs Zinc White, Ltd., appealed on the ground that no case had been made out for the granting of a compulsory licence.

His lordship said the question was whether McKechnie's had made out a case for a compulsory licence. Had there been here an abuse of monopoly rights? Was the patent being worked in the United Kingdom on a satisfactory scale? It was said that it was capable of being worked in the United Kingdom on a satisfactory scale. It was admitted that at one time there was no working of the patent. But the working commenced a few days after the making of the order, resulting in an output for 1933 of some 4,200 tons. He held that this working could be taken into consideration in considering the question of monopoly rights. Orrs had manufactured lithopone since 1932 and up to that time there had been an importation from Germany of many thousands of tons. It appeared that the I. G. had refused a licence to McKechnie, when they applied, but in 1932 the I. G. granted a licence to Orrs. He was satisfied that the patent was not being worked on a commercial scale or adequately or reasonably and he was satisfied that the licence granted to Orrs was not a bona fide licence. The circumstances were full of suspicion. He was satisfied that there had been an abuse of monopoly rights. In his view the comptroller was right and a compulsory licence should be granted.

The terms of the licence will be dealt with at a later date.

Here and There at Cardiff

FOLLOWING the annual business meeting on Tuesday morning, Dr. J. T. Dunn, accompanied by all the members, laid a wreath on the Welsh National War Memorial in Cathays Park.

* * *

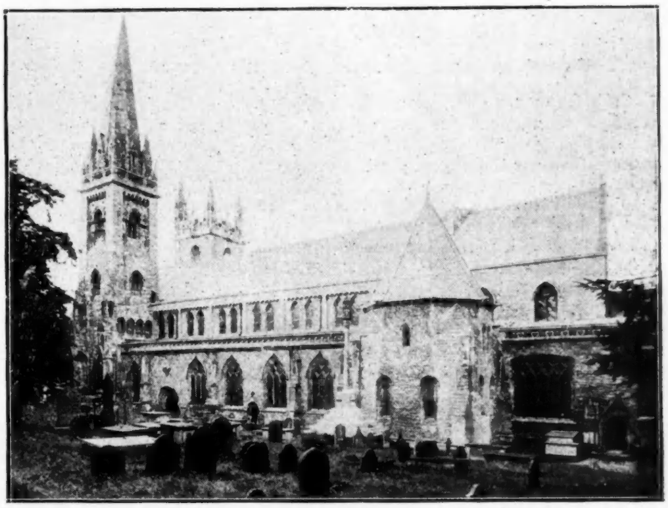
THE invitation luncheon on Tuesday at which the visitors were the guests of the South Wales Section, was to have been held at St. Fagan's Castle, but the accommodation proved too small for the large number who accepted invitations, and it was therefore held at the City Hall, Cardiff.

* * *

THE South Wales Section, at whose invitation the Society of Chemical Industry held its annual meeting this week at Cardiff, is one of the youngest sections of the Society, having been formed as recently as 1921. Its activities cover an area of a hundred miles, from Newport (Mon.) in the east to Llanelly in the west, which can be divided into three regions. The first contains the Monmouthshire coal field, the Pontypool tinplate industry and the sulphuric acid works of Newport and Cwmbran. The second includes the mining and by-product industry of Cardiff and the adjacent valleys, and the third the extensive tinplate and non-ferrous metal industries, chemical industries and anthracite coal fields of Swansea and district. The affairs of the section are carried on at two centres, namely, Cardiff and Swansea, each having an independent committee in communication with the parent society through the hon. secretary. The annual meeting of the section is held alternately at Cardiff and Swansea. The present chairman of the section is Mr. C. M. B. Grieb, and the hon. secretary is Dr. E. A. Rudge.

Scenes In and Around Cardiff

Beauty Spots Visited This Week



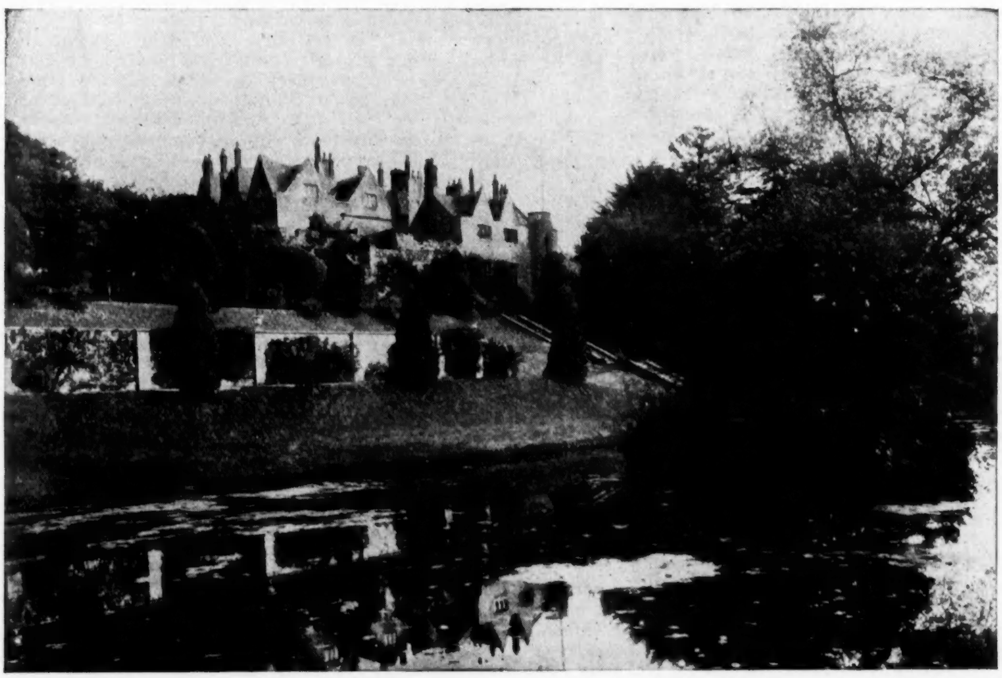
Llandaff Cathedral

WARM hospitality has been extended to the members of the Society of Chemical Industry by the civic and educational authorities of the city and port of Cardiff this week, and several of the most important public buildings have been at the Society's disposal for meetings and receptions. In addition, there have been visits, organised and impromptu, to several of the beauty spots of South Wales. Cardiff Technical College, the meeting headquarters, is one of a fine group of buildings in the civic centre in Cathays Park. Its industrial chemistry department gives a full time University Degree and Diploma course, and meets the needs of industries depending upon chemistry. The department is recognised by the Institute of Chemistry, and the Welsh College of Pharmacy, training pharmacists and dispensers, is fully recognised by the Pharmaceutical Society and by the University of London in connection with its B.Pharm. degree.

The University College of South Wales and Monmouthshire, where the opening reception was held on Monday night, celebrated its jubilee last year. It was opened in October, 1883, by the first Lord Aberdare and was incorporated by Royal Charter in 1884. The college became a constituent college of the University of Wales in 1893.

Erected in 1904, the City Hall and Law Courts, where the principal social events were held, form a dignified group which has already been enriched by numerous gifts of paintings and statuary. The National Museum of Wales, where Sir Harry McGowan delivered his Messel lecture on Thursday afternoon, was founded in 1907, the Royal Charter of Incorporation having been granted in that year by King Edward VII. The foundation stone was laid in 1912 by the present King, and the first portion was formally opened by His Majesty in 1927, a later addition being opened by Prince George two years ago.

St. Fagan's Castle, the residence of the Earl of Plymouth, visited by the ladies of the party on Tuesday, was built in the twelfth century. Cardiff Castle embraces work covering a period of nearly twenty centuries.



St. Fagan's Castle, the residence of the Earl of Plymouth

Trade Mark Appeal

Translation and Variations of a Phrase

IN the Chancery Division on July 13, Mr. Justice Luxmoore commenced the hearing of an appeal by J. C. Eno, Ltd., of Piccadilly, against a decision of the Comptroller of Patents allowing the registration by Evans Sons, Lescher & Webb, Ltd., of Liverpool, of a trade mark consisting of a label, on which there was a fruit device and legend "Fru-tu-don" and "Salina de Frutas."

Mr. Whitehead, K.C., appeared for Eno, Ltd., and said the words "Fruit Salts," and "Eno's Fruit Salts," and their equivalent in foreign languages were well known throughout the world as the distinctive goods of the appellants and for many years they had been the registered proprietors in Great Britain and many foreign countries of words covering the use of such words and translations and variations thereof.

In this country fruit salts and sal de fructo were well known as denoting salts of the appellants' manufacture, which also were sometimes called Saleno. The present Evans Sons, Lescher & Webb had sold their preparations under a number of names of Salina aux de Evans, and Evans Effervescent Saline without objection from Eno Ltd., but they now alleged that the use of the proposed trade mark was calculated, whether intentionally or not counsel could not say, to attack Eno's goodwill in the nature of their trade mark.

Messrs. Evans admitted that the words Eno's Fruit Salts and their foreign equivalent were distinctive of Eno's goods, but they denied that in any country the words Fruit Salts denoted the manufacture of appellants. The words, they said, had always been descriptive of an effervescent saline preparation and had been used throughout the world for many years by manufacturers and traders and the public were aware of it. The words appellants contended were always used in connection with the name Eno's, and that it was their true and distinctive and distinguishing trade mark.

Mr. Griffiths for Evans Sons, Lescher & Webb argued that the words complained of were not calculated to deceive and he upheld the decision of the Comptroller.

Mr. Griffiths made a declaration to show that in Latin-American countries the words Saline de Fructus and Sal de Fructas were commonly used to describe saline preparations and that the custom was for manufacturers to add their names to indicate their goods.

His Lordship suggested that Messrs. Evans should substitute effervesente for de fructas and then their goods would not be mistaken for anyone else's. There could not be the smallest objection to the mark being altered as suggested.

After consultation it was agreed that apart from Peru, where registration had been obtained, Messrs. Evans would alter their labels as suggested by his Lordship by substituting effervesente for de frutas. On that undertaking no order was made on the motion, but the Registrar would proceed with the registration of the mark as altered.

Lawn Tennis Tournament

Results of Third Round Matches

THREE of the four doubles matches in the third round of THE CHEMICAL AGE Lawn Tennis Tournament have now been played off. V. J. Prosser and A. Baxter (John Haig and Co., Ltd.) have defeated E. H. M. Badger and R. N. B. D. Bruce (Gas Light and Coke Co.) by 6-3, 6-4; F. G. Hawley and J. Haines (Anglo-Persian Oil Co., Ltd.) the present holders of the Doubles Challenge Cup, beat A. E. C. Willshere and L. F. Grape (Borax Consolidated, Ltd.) 6-1, 6-1; and A. S. Marcar and G. H. Trigg (Bovril, Ltd.) beat E. Thomsett and R. Welsh (British Oxygen Co., Ltd.) 6-2, 6-3.

In the third round of the singles, the following results have now reached us:—A. Collins (British Oxygen Co., Ltd.) beat H. R. Whittaker (Williams (Hounslow), Ltd.) 6-0, 10-8; R. N. B. D. Bruce (Gas Light and Coke Co.) received a walk-over, his opponent, H. A. Hare (Grindley and Co., Ltd.) having scratched; A. S. Marcar (Bovril, Ltd.) beat W. L. Alldis (Brandhurst Co., Ltd.) 6-2, 6-3; L. Giltrow (Williams (Hounslow), Ltd.) beat the holder of the Singles Challenge Cup, C. G. Copp (Doulton and Co., Ltd.) 6-3, 7-5.

Extraction of Dead Sea Salts

Injunction Sought

IN the King's Bench Division on Tuesday, Mr. Justice Roche concluded the hearing of an action by Berlotz and others against Palestine Potash, Ltd., claiming a declaration that the defendants were not entitled to extract salts from the waters of the Dead Sea and an injunction to prevent them doing so. They also claimed an account of salts already extracted by the defendants and damages.

Sir Leslie Scott, K.C., for plaintiffs, said the action related to the extraction of bromine, potash and other salts from the waters of the Dead Sea. The dispute was whether the plaintiffs had a good title from the Sultan of Turkey, a title granted in 1910, or whether the defendants had a good title under a grant by the High Commissioner of Palestine in 1930. The defence raised a plea of jurisdiction, it being contended that an English Court could not deal with the case. He had to admit that the condition granted by the Sultan dealt with real property, what in international law was called "immovables," and it was clear that, speaking generally, English Courts had no jurisdiction over immovable property situated in another country. There was a remise of land contiguous to the Dead Sea for setting up a factory and he was obliged to admit that the Court had no jurisdiction, unless he could establish a contractual or equitable obligation on the defendants which plaintiffs were seeking to enforce. No pleading had been put in of such contractual or equitable obligation because plaintiffs had not had enough knowledge of the facts, but he had been supplied with correspondence which indicated that there might be such a relationship.

Sir Wm. Jowitt, K.C., for defendants, said that, apart from the question of jurisdiction, his defence was that where one state had been conquered by another, concessions granted previously by the conquered state need not be recognised by the conqueror. The question whether the conqueror had in fact recognised such a concession was one of fact.

After arguments the plaintiffs admitted that the Court had no jurisdiction and his Lordship dismissed the action with costs.

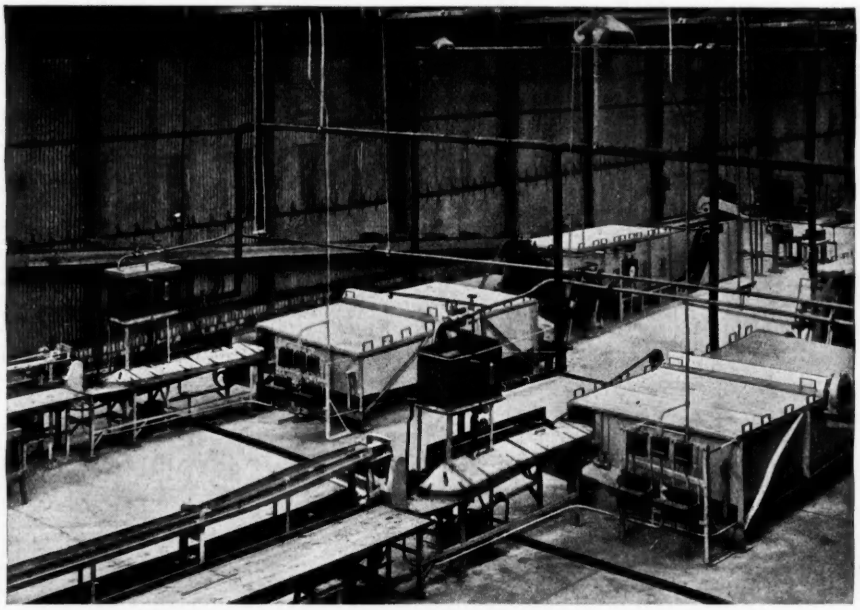
Industrial Water Supplies

The Importance of Boreholes in Times of Drought

THE drought has taught us to realise how important a good supply of water really is, and how distressing a shortage can be, not only in our private lives but also in our industrial life. Millions can and have been spent in building huge reservoirs to store the water flowing down the catchment areas and along rivers, but unless there is a copious supply feeding those sources the reservoirs become empty spaces.

Fortunately in this country drought is a comparatively rare event, but our advanced state of civilisation and sanitation make it a very serious problem when it does happen. Therefore, we are compelled to look for other sources of supply to deal with the emergency when it does arise, and boreholes have proved very useful in augmenting supplies in many ways, particularly for industrial purposes. Corporations are now putting down boreholes to fill up their reservoirs or for reserve to be used in an emergency like the present. Manufacturers having been warned are putting down boreholes to keep their works running as well as to cheapen the cost of production. Where cold water is required for cooling purposes, borehole water is ideal, being about 52° to 54° F. and is constant all the year round.

Boreholes are also put down to prove strata before heavy structures are erected, so that the architects may put down suitable foundations and so avoid trouble later. For prospecting such as searching for coal, salt and minerals, a borehole is useful to prove the depth from the surface, and the thickness of the seams, by bringing up cores, or samples of the material encountered. Coal being somewhat friable, special tools are necessary and diamonds are fixed in the face of the rotary tools to make sure of getting good unbroken cores. John Thom, Ltd., inform us that they are extremely busy with contracts in different parts of the country, both for water supplies and prospecting work.



At this fruit canning establishment the whole of the pipework in contact with fruit juice is made of Monel metal. In addition, certain parts of the equipment are also constructed of Monel metal, because all fruit juices are acid and it is very essential to avoid contamination of the canned fruit.

Works Equipment News

Monel Metal Pipes for Corrosion Resistance

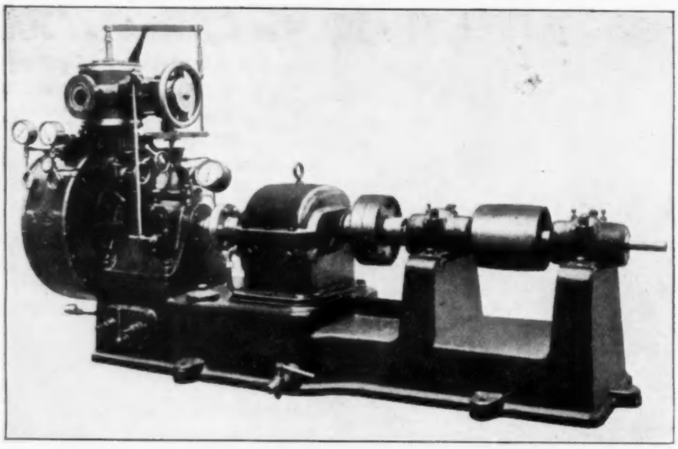
THERE are many industries where Monel metal pipe installations are employed. Broadly speaking, the food and chemical trades are the largest users for they face problems involving corrosive conditions and the maintenance of purity in their products more frequently than most other trades. In canneries, where citric acid additions are usually made to syrups, Monel metal piping is employed for conveying lines from kettles to filling machines. Where fruit juices or tomato products are encountered Monel metal pipes are also extensively employed. Most fruit juices are corrosive, some extremely so, and the fact that Monel metal has been adopted by the industry on a very wide scale is, therefore, the more significant.

Among the more important staple chemicals handled in Monel metal tubing may be mentioned industrial alcohol and benzene. Some of the earliest uses developed in the dyeing industry, into which this alloy was introduced over a quarter of a century ago. Since that time large quantities of Monel metal have been produced for use in dyehouses and bleacheries and many plants now have complete Monel metal installations. The fact that this metal is practically without effect on most colours has resulted in its introduction into other fields where similar problems exist. The manufacture of the actual dyestuffs is a case in point. Another and less well-known field is in the manufacture of the colours used in the production of printers' inks. Numerous corrosive solutions require to be handled in the production of these colours including both organic and inorganic acids and alkalies. For the most part weak acid solutions are encountered, and these are generally warm and agitated. Monel metal piping is here employed successfully in contact with hydrochloric and acetic acids, ammonia and caustic soda solutions. These solutions are normally heated by dry steam passed through Monel metal coils in the bottom of large vats, and most of them are raised to boiling point. One installation for manufacturing the Azo group of colours has been working since 1929, handling the solutions mentioned above and with the exception of a small cock that has been affected by chlorine no appreciable corrosion has occurred. This installation comprises a number of pipe lines, steam coils, cocks and fittings made from Monel metal.

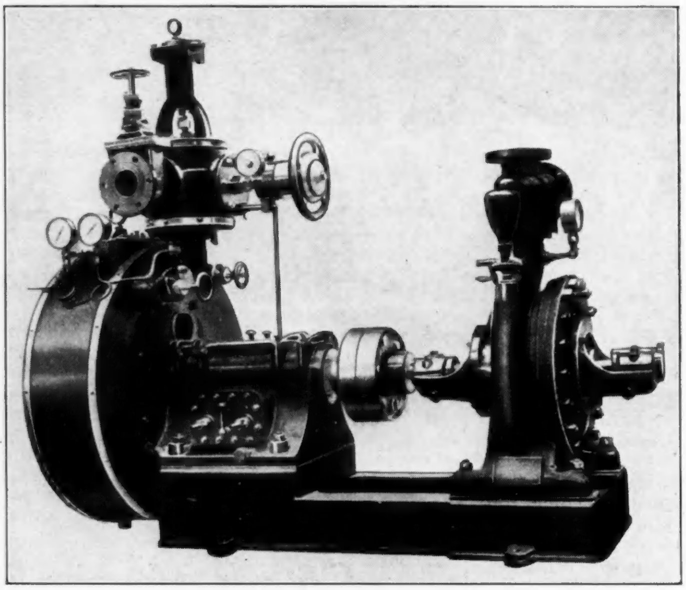
The widespread use of Monel metal is primarily due to the remarkable corrosion-resistance which the alloy offers to the great staple products of the chemical industry. There are other fields where Monel metal pipe lines have been adopted on a large scale because of its corrosion-resisting properties. For instance, the leading breweries in England and Wales have proved conclusively that Monel metal is the ideal material to use in contact with beer and many hundreds of cellar piping installations have been made throughout the country. This metal does not promote haze in beer and does not affect the taste in any way; nor is the metal affected by prolonged contact. The fact that suitable sources of supply for cast fittings are available has been an important factor in the adoption of Monel metal piping installations, as the use of different metals in any system where corrosive liquids are handled involves the risk of electrolytic action.

Jigs and Fixtures for Welding

AN interesting booklet published by the Linde Air Products Co., of New York, consolidates and crystallises current ideas on how to design jigs and fixtures for welding, whether it be production fabrication or repair work. The importance of proper design of jigs can hardly be over-emphasised. It is a consideration which bears directly on the production cost of a welded article. Labour, time and handling charges, in an operation that has to be repeated in the manufacture or repair of similar articles, can be substantially reduced by properly designed work-holding devices. This booklet tells what considerations must be taken into account in order to realise to the maximum such benefits. The four definite advantages derived from the use of fixtures and jigs—convenience to the operator, a reduction of the cost of the articles, standardisation of articles, and accuracy in fabrication—are discussed in their relation to the economics of production. The fundamentals of design are also given and their influence on cost reduction is discussed. Clamping devices are described, with suggestions on how they are made. The control of heat effects on the jig from the blowpipe flame is treated at some length, and the booklet is plentifully illustrated with photographs and sketches showing every point. Many useful ideas can be gleaned from the illustrations alone.



This Steam Turbine, made by Daniel Adamson & Co., Ltd., Has been installed at an Ice Factory. This turbine (Type T.P.5) is applicable where constant speed is not absolutely essential.



Another Steam Turbine (Type T.P.7), by Daniel Adamson & Co., Ltd., directly coupled to a Centrifugal Pump.

Steam Turbines

for Chemical Works

THE development in design of large steam turbines for driving electric generators, turbo-compressors, blowers, pumps ventilating fans, etc., is shown by the ever-increasing demands for such plant, and the greatly extended use in recent years is evidence of the popularity of this type of prime mover. During their 30 years' experience in the design and manufacture of steam turbines, Daniel Adamson and Co., Ltd., have found that little attention has been paid by manufacturers to the design of small steam turbines for driving centrifugal pumps, small generators, fans and other similar auxiliary plant. Being alive to new possibilities, the Adamson "Roth system" steam turbine has, therefore, been developed in order to fulfil the requirements of almost every industry for a small and efficient steam turbine at a comparatively low cost.

In commercial processes such as exist in paper mills, chemical works, dye works, sugar refineries, woollen and cotton mills, and wood conditioning plants, turbines possess considerable advantages, as they may be arranged to drive any class of machinery, while a portion or the whole of the process steam may be obtained from the exhaust of the turbine.

The Adamson " Roth system " turbines are of the impulse type, the steam being expanded through convergent divergent nozzles and thsse nozzles directed at a suitable angle to the blades of the wheel. The turbines are made in sizes ranging from 2 h.p. upwards, with speeds varying from 1,500 to 5,000 r.p.m, and are designed for a working pressure of from 25 lb. per square inch upwards and allowing a back pressure up to 40 lb. per square inch. They can be driven with dry saturated steam or with superheated steam; in the former case, however, it is always advisable to install an effective steam dryer which should be placed as near as possible to the turbine. Three standard series of machines are made. One is specially designed for driving generators, alternators and similar machinery where it is absolutely essential that the speed should remain constant. The second type is specially designed for driving air compressors, centrifugal pumps and like machines where constant speed is not necessarily essential, but where the pressure must remain constant. The third type is designed for driving fans, blowers and similar auxiliaries where a relatively constant speed is essential. In cases where the steam pressure has exceeded 200 lb. per square inch special machines have been designed, but their employment has been governed by the particular conditions on site, consideration also being given to the type of machine which the turbine has to drive.

A Double-Acting Piston Pump

FOR sump drainage and kindred duties a new hand pump manufactured by the Pulsometer Engineering Co., Ltd., merits attention. This is a double-acting piston pump, designed with the piston rod actuating the piston carried through a gland in the cover and attached to a handle which is pivotted on a link extended from the cover, so that the operating motion is toward and away from the pump, thus giving the worker greater power with less fatigue than can be obtained with the usual form of semi-rotary pump. If desired, the handle can be easily and quickly removed by drawing out two split-pins.

At 100 double strokes per minute the output obtainable with a ¾ inch size Pulsometer hand pump is 500 gallons an hour against a total head of 50 feet. Two larger sizes with outputs of 700 gallons and 1,000 gallons per hour respectively are made. There is only one working part, a double acting piston with self-contained valves; there are no leathers to give trouble. By removing the cover the whole pump can be dismantled without disturbing pipes or disconnecting the handle. The absence of valves in the casing enables the water in the pump and pipes to drain past the piston when at rest, and so does away with the need to drain the pump during frosty weather. A strong feature is the high vacuum these pumps produce. They are suitable for suction lifts up to 25 ft., without priming, and can be used for handling water or oil.

News from the Allied Industries

Rubber

THE RUBBER POWDER CO. has received the first consignment of powdered rubber produced by the de Schepper process on the Dangan Rubber Estates property in Ceylon. The process is automatic, and eliminates smokehouses, drying lofts, heavy machinery, and chemicals on the plantation.

Sugar

THE MINISTER OF AGRICULTURE and the Secretary of State for Scotland have appointed Mr. F. J. Wrottesley, K.C., to hold a public inquiry into objections received to the Sugar Marketing Scheme. The hearing will be opened at 10.30 a.m. on July 30, at Middlesex Guildhall, Westminster.

Cement

AN AGREEMENT HAS BEEN ENTERED INTO under which the whole of the share capital of the Thames Portland Cement Co., Cliffe, near Rochester, has been acquired by Alpha Cement. The works of the Thames Portland Cement Co. provide facilities for deep water shipment and arrangements are being made to materially increase its production, and, by the construction of a new jetty, the company will be able to ship cement to all the coastal ports of England. It will be remembered that Alpha Cement recently acquired the works of Oxford and Shipton Cement, near Oxford, and also owns a modern plant at Rodmell, situate between Lewes and Newhaven.

Iron and Steel

A PRELIMINARY AGREEMENT has been entered into between Thos. Firth and John Brown and the English Steel Coropration for the formation of a new company to acquire, as from October 1, 1934, their respective businesses as producers of stainless and staybrite steels. The new company will be called "Firth-Vickers Stainless Steels, Ltd.," and Thos. Firth and John Brown and the English Steel Corporation will each hold one-half of the subscribed capital. The board of the new company will be appointed by the two parent companies, and Mr. A. J. Grant will be the first chairman. This arrangement is confined to stainless and staybrite steels, and will not affect the other activities of the parent companies.

Whale Oil

THE HULL DEVELOPMENT COMMITTEE recently received an inquiry from a London firm of consulting engineers for a site, with river frontage and rail facilities, for a proposed whale oil factory.

Molasses

THE UNITED MOLASSES CO. redeemed £300,000 of its six per cent. Cumulative unsecured income debenture stock on June 30 last. The company now announces its intention to redeem a further amount of £350,000 of the stock, the outstanding amount of which is £912,781. The particular stock to be dedeemed will be selected by a drawing to be made on July 24, and the requisite three months' notice will be given on or before July 31 to the holders of the stock drawn for redemption.

China Clay

THE RETURNS OF CHINA CLAY SHIPMENTS for June are very encouraging and although they were not quite up to the record shipping activity in May, they were sufficient in volume to reveal a continuance of that revival of trade which set in with the year 1932. It is very gratifying to find that the home markets for china clay and china stone are greatly improving and the demand on the Continent is on the increase. The consumption of Cornish china clay in the United States is still abnormally low, but producers are, however, hoping for improvement in the near future. China stone appear to be in better demand, which is an index to better conditions in the ceramic industry. The details of shipments for June are as follows:—Fowey, 37,120 tons of china clay; 3,964 tons of china stone; 206 tons of ball clay. Par, 8,372 tons of china clay; 522 tons of china stone. Charlestown, 7,315 tons of china clay; 417 tons of china stone. Penzance, 1,058 tons of china clay. Padstow, 752 tons of china clay. Looe, 199 tons of china clay. Newham, 101 tons of china clay. Plymouth, 85 tons of china clay. Borne by rail to inland towns, 4,500 tons of china clay; making a total of 64,611 tons compared with 70,862 tons in May and 59,777 tons in April. For the half-year ending June 30, the output of china clay amounted to 340,311 tons, which is a considerable improvement on the corresponding period in 1933.

Continental Chemical Notes

POLISH COPPER SULPHATE is now quoted at 40 zloty per 100 kilograms as compared with 115 zloty in the middle of 1932.

* * *

THE PHONIX CO., OF BAIA MARE, Roumania, proposes to add pigments and bleaching earths to its range of manufactures.

* * *

ONE TO TWO TONS OF SELENIUM in 99 per cent. purity is the anticipated output of the Kyschtym Mines (Russia) up to the end of the present year.

* * *

MAGNESIUM ORE DEPOSITS at Topolcany, Czecho-Slovakia, are to be exploited by a newly-formed company with headquarters in Prague.

* * *

TWO MUNICIPAL GASWORKS IN COPENHAGEN are to be equipped with benzole extraction and refining plant at a cost of 250,000 kronen. A local firm of dyestuff manufacturers will absorb the output.

* * *

THE JUGOSLAVIAN CONCERN, Dalmatienne, is understood to be pushing forward its development plans, which had been postponed owing to the unfavourable economic outlook, with special reference to a new ammonia factory.

UREA MANUFACTURE has been embarked upon by the Compagnies des Produits Chimiques et Electrométallurgiques Alais, Froges et Camargues at their works at Péchiney (France).

* * *

IN CO-OPERATION WITH THE I. G. FARBENINDUSTRIE, the Bemberg concern is responsible for a new synthetic textile, likewise based upon the cuprammonium reaction, distinguished by high wet strength and good milling qualities. The current daily production is 2,000 to 3,000 kilos.

* * *

BEMBERG A.G. HAVE ANNOUNCED the successful production of a cellulose film material by the cuprammonium process. It has already been resolved to erect a small-scale plant for the material which will be marketed under the brand name of Cuprophon.

* * *

DIAZODIPHENYLAMINE, the basis for a new type of blue print photographic paper, will be in production on a large scale in the near future at a Russian chemical factory, states a Moscow press item, and should result in a decline in importations of citric acid which is an important ingredient of ordinary blue-print paper.

WASTE FOREST WOOD is convertible into animal feeding stuff with a maximum digestibiity of 77 per cent. by a process developed by Schwalbe in the Eberswalde Wood Research Institute and particularly suitable for small scale operation. It involves mechanical treatment of the wood in an edge runner mill and simultaneous exposure to the partial hydrolysing and swelling action of lactic acid.

* * *

POTASSIUM PERMANGANATE, potassium nitrate and sulphur are among the ingredients of a new type of magnesium flash-light powder composition which can be ignited without detonation in cartridges through the medium of a percussion cap. According to German Patent 592,898, 700 to 900 parts of magnesium are admixed with sulphur (10 to 18), potassium permanganate (100 to 140), potassium nitrate (70 to 85), magnesia (100 to 160) and wood charcoal (10 to 30).

THE REDUCING ACTION OF TRIETHANLAMINE upon salts of silver, mercury and gold was first noticed by Jaffe in 1932 (" Ann. Chim. App.," 1932, page 737). The same worker (" Industria Chimica," June, 1934) has now described reactions of triethanolamine with prosphoric acid, phosphates, molybdates, vanadates, iodine, boric acid and iron salts, some of which may prove useful in qualitative analysis.

* * *

COLOURED STEARINE PITCH IMPREGNATING MASSES for roofing board are discussed by Dr. C. R. Platzman in the " Chemiker-Zeitung " of July 4. A typical recipe for a green mass comprises: Hard stearine pitch (45 parts), soft stearine pitch (17), wool fat (5) and green chromium oxide (33). A bright red impregnating mass can be made by incorporating gilsonite (25), medium-hard stearine pitch (25), wool fat pitch (20), and red oxide of iron (30).

Inventions in the Chemical Industry

Patent Specifications and Applications

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under " Applications for Patents " are for reference in all correspondence up to the acceptance of the Complete Specification.

Complete Specifications Open to Public Inspection

BUTYL ALCOHOL and acetone by fermentation, production.—Commercial Solvents Corporation. Jan. 7, 1933. 36410/33.

BUTYL ALCOHOL by fermentation, production.—Commercial Solvents Corporation. Jan. 3, 1933. 36411/33.

HYDROCARBON OILS, treatment.—Standard Oil Co., Indiana. Jan. 3, 1933. 36628/33.

HYDROURACILE SERIES, manufacture of compounds.—Dr. K. Merck, L. Merck, W. Merck, and F. Merck (trading as E. Merck (firm of)). Jan. 3, 1933. 160/34.

INDIGOID DYESTUFFS, manufacture.—Soc. of Chemical Industry in Basle. Jan. 4, 1933. 237/34.

ANHYDROUS SULPHATE OF COPPER potassium and process and apparatus for the manufacture thereof.—P. Lanthier. Jan. 5, 1933. 417/34.

BARBITURIC ACID DERIVATIVES, manufacture.—Chemische Fabrik von Heyden A.-G. Jan. 6, 1933. 473/34.

GELATINE for photographic purposes, manufacture.—A. Dressler and K. Walther (trading as Dressler and Walther (firm of)). Jan. 7, 1933. 551/34.

Specifications Accepted with Dates of Application

CATALYTIC THERMAL CONVERSION of hydrocarbon gases or their mixtures into benzene and its homologues and higher aromatic hydrocarbons.—C. J. Greenstreet. Sept. 28, 1932. 412,933.

CATALYTIC SYNTHESIS of furfuryl-amines.—Goodyear Tire and Rubber Co. June 28, 1932. 412,914.

RESINS, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). Dec. 12, 1932. 413,007.

ANTHRAQUINONE DYES.—Imperial Chemical Industries, Ltd., S. Ellingworth, N. H. Haddock, F. Lodge, and C. H. Lumsden. Dec. 30, 1932. 412,920.

ALKYL OR ACYL CELLULOSE ARTIFICIAL SILK, delustrong.—Imperial Chemical Industries, Ltd., C. Dunbar and L. G. Lawrie. Jan. 3, 1933. 412,929.

ARTIFICIAL SILK, delustring.—Imperial Chemical Industries, Ltd., C. Dunbar and L. G. Lawrie. Jan. 3, 1933. 412,930.

DYEING ACETYL-CELLULOSE and mixed materials containing acetyl-cellulose.—J. R. Geigy A.-G. Jan. 8, 1932. 412,945.

DISAZO DYESTUFFS, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). Jan. 7, 1933. 412,992.

PIGMENTS, manufacture.—I. G. Farbenindustrie. Jan. 13, 1932. 413,014.

ALBUMIN CLEAVAGE PRODUCTS, production of derivatives.—Chemische Fabrik Grunau Landshoff and Meyer A.-G. Feb. 16, 1932. 413,016.

CONVERSION OF OLEFINES and water vapour into alcohols.—Distillers Co., Ltd., W. P. Joshua, H. M. Stanley and J. B. Dymock. Feb. 8, 1933. 413,043.

ARTIFICIAL VISCOSE SILK, manufacture.—North British Rayon, Ltd., and E. Walls. April 10, 1933. 413,087.

COLOURING BODIES and pigments, production.—Dr. A. Sander. June 3, 1932. 413,098.

SULPHUR DYESTUFFS, manufacture.—E. I. du Pont de Nemours and Co. June 23, 1932. 413,118.

DYEING OF CELLULOSE ESTERS or ethers.—I. G. Farbenindustrie. Dec. 3, 1932. 413,198.

PRODUCTION OF MAGNESIA from dolomite.—I. G. Farbenindustrie. March 13, 1933. 413,240.

Applications for Patents

July 5 to 11 (inclusive).

PURIFICATION OF TAR ACIDS.—Barrett Co. (United States, July 19, '33.) 20368.

METHODS of obtaining ketones from alcohols.—Commercial Solvents Corporation. (United States, April 7.) 20011.

METHACRYLAMIDE, production.—J. W. C. Crawford, Imperial Chemical Industries, Ltd., and J. McGrath. 20152.

MIXED CARBONYL SALICYLIC ETHER-ANYDRIDE of salicylo-carbonic acid and homologues and derivatives thereof, manufacture.—L. A. Dupont. (France, July 11, '33.) 19783.

METAL SULPHIDE ORES, treatment.—A. H. Edwards. 20216.

SALTS OF AROMATIC AMINOALCOHOLS, manufacture.—J. B. Ellis (Firm of E. Merck). 20154.

WATER SOFTENING.—E. W. A. Humphreys. 20107.

TREATMENT of originating materials containing lithium phosphate.—H. H. Hutte. (Germany, July 13, '33.) 20210.

TREATMENT of originating materials containing lithium phosphate.—H. H. Hutte. (July 10.) (Germany, July 9.) 20395.

ACRIDINE DERIVATIVES, manufacture.—I. G. Farbenindustrie and F. Mietzsch. 19821, 19822.

SOLID DIAZONIUM SALTS, manufacture.—I. G. Farbenindustrie. (Germany, July 7, '33.) 20080.

CONDENSATION PRODUCTS, manufacture.—I. G. Farbenindustrie. (Germany, July 12, '33.) 20241.

APPARATUS for degreasing metals, etc.—Imperial Chemical Industries, Ltd. 19811.

NAPHTHALENE DERIVATIVES, manufacture.—Imperial Chemical Industries, Ltd., A. Kershaw and M. Wyler. 19812.

ORGANIC COMPOUNDS.—Imperial Chemical Industries, Ltd. and M. Polanyi. 20150.

DYESTUFF INTERMEDIATES.—Imperial Chemical Industries, Ltd. and W. A. Sexton. 20151.

SECONDARY DIAZO DYESTUFFS.—Imperial Chemical Industries, Ltd., and A. H. Knight. 20370.

POLYMERISATION PRODUCTS.—J. Y. Johnson (I. G. Farbenindustrie). 20097.

VINYL COMPOUNDS, production.—J. Y. Johnson (I. G. Farbenindustrie). 20098.

NITROGENOUS DERIVATIVES of dibenzanthrone, manufacture.—E. R. Johnson. 20232.

DECOMPOSITION of nitrosyl chloride.—Kali-Forschungs-Anstalt Ges. (Germany, August 5, '33.) 19881.

ALCOHOL, dehydration of.—W. A. McMullen. 19832.

CONDENSING MAGNESIUM VAPOURS.—Magnesium Products, Inc. (United States, July 8, '33.) 20130.

REFINING MAGNESIUM.—Magnesium Products, Inc. (United States, July 11, '33.) 20342.

ETHYLENE OXIDE, manufacture.—Soc. Française de Catalyse Généralisée. (France, July 10, '33.) 20089.

DYESTUFFS.—Soc. of Chemical Industry in Basle. (Sept. 20, '33.) 19904.

MANUFACTURE of 1-alkylamino-4-arylamino-anthraquinones.—(Dec. 11, '33.) 20081.

SOAP AND GLYCERINE, manufacture.—R. H. A. Thomas. 19984.

Weekly Prices of British Chemical Products

Review of Current Market Conditions

MOST sections of the chemical market report fairly satisfactory business during the past week. Acetic acid and potassium salts have been in better demand, and good business has been done in acetone, formaldehyde, formic and oxalic acids and salammoniac, but arsenic, barium chloride, sodium sulphide and zinc oxide continue to be dull items. Prices have been maintained in the coal tar products market, but business is only fair. A reduction of price is shown for toluol. Creosote oil remains in good demand and there is a satisfactory inquiry for cresylic acid. Good sales of refined tar are reported from several districts, but other coal tar products are rather inactive. In the pharmaceutical market business in cream of tartar, sodium benzoate, citric and tartaric acids has been on a good scale. There has been an increased demand for small quantities of hydroquinone and more interest in barbitone. A fair volume of business has been tranacted in essential oils. An increase of price is shown for Japanese and Wayne County peppermint both of which have been active items.

LONDON.—There are no changes in prices to report, steadiness in values being the general tone. Demand, all things considered, is satisfactory. The coal tar products market remains quiet, with no change in prices from last week.

MANCHESTER.—Following upon the previous week's interruption to the Manchester chemical market, as a result of the test match, this week's important Tuesday market on the Royal Exchange was not held in consequence of the visit of His Majesty the King to Manchester. In some respects, therefore, it has been difficult actually to test the market, though the tendency in most respects is undoubtedly still quite steady so far as the heavy chemicals are concerned, although in the case of the by-products, where values are not strictly nominal as a result of the absence of business, most materials are playing a certain amount of easiness, carbolic and the xylols and toluols being outstanding examples. Business in chemicals this week has been on moderate lines, with seasonal activity reported in citric and tartaric acids, and a few other lines. Deliveries to consumers against contracts have been maintained in most instances.

SCOTLAND.—Business is at a standstill at the moment owing to the Scottish holidays.

Price Changes

General.—BARYTES, £6 10s. to £2 per ton; "RUPRON" (mineral rubber), £15 10s. per ton; SULPHUR, £9 15s. to £10 per ton; POTASSIUM CHLORATE (Manchester), £38 per ton; POTASSIUM PERMANGANATE (Manchester), B.P. 9¾d. per lb.; POTASSIUM PRUSSIATE (Manchester), Yellow 8¼d. to 8¾d. per lb.

Coal Tar Products.—ACID, CARBOLIC (Manchester), crude 1s. 11d. to 2s. per gal.; crystals, 8d. per lb.; TOLUOL, 90%, 2s. 1d. per gal., pure, 2s. 4d. per gal.

Pharmaceutical and Photographic Chemicals.—Menthol A.B.R. recryst. B.P., 10s. 6d. per lb.

Essential Oils.—PEPPERMINT, Japanese, 4s. 3d. per lb.; Wayne County, 15s. 6d. per lb.

Intermediates.—NITROBENZENE, 5d. per lb.; *o*-TULUIDINE, 11d. per lb.

All other prices remain unchanged.

General Chemicals

ACETONE.—LONDON. £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £38 5s. to £40 5s.; pure 80%, £39 5s.; tech., 40%, £20 5s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. LONDON: Tech., 80%, £38 5s. to £40 5s.; pure 80%, £39 5s. to £41 5s.; tech., 40%, £20 5s. to £22 5s.; tech., 60%, £29 5s. to £31 5s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £39 5s.; tech. 80%, £38 5s. d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—Commercial granulated, £25 10s. per ton; crystal, £26 10s.; powdered, £27 10s.; extra finely powdered, £29 10s. packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots.

ACID, CHROMIC.—10½d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—9d. per lb. less 5%.

ACID, CRESYLIC.—97/99%, 1s. 8d. to 1s. 9d. per gal.; 98/100%, 2s. to 2s. 2d.

ACID, FORMIC.—LONDON: £43 10s. per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £48; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £53; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works, according to district and quality. SCOTLAND: 80°, £23 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 17s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: 98/100%, £48 to £50 ex store. MANCHESTER: £49 to £53 ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—LONDON: 1s. per lb. SCOTLAND: B.P. crystals, 11d., carriage paid. MANCHESTER: 1s. 0⅜d.

ALUM.—SCOTLAND: Lump potash, £8 10s. per ton ex store.

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE. SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—£37 to £45 per ton, carriage paid. LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—SCOTLAND: Spot, £26 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden 6¼d. to 1s. 1½d. per lb.; crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC.—LONDON: £16 10s. c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £23 ex wharf. MANCHESTER: White powdered Cornish, £21 ex store.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—£11 per ton.

BARYTES.—£6 10s. to £8 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%, £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 in 5/6 cwt. casks for contracts over 1934/1935.

BORAX, COMMERCIAL.—Granulated, £14 10s. per ton; crystal, £15 10s.; powdered, £16; finely powdered, £17; packed in 1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots.

CADMIUM SULPHIDE.—2s. 7d. to 2s. 11d.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums.

CARBON BISULPHIDE.—£30 to £32 per ton, drums extra.

CARBON BLACK.—3⅞d. to 5d. per lb. LONDON: 4½d. to 5d.

CARBON TETRACHLORIDE.—£41 to £46 per ton, drums extra.

CHROMIUM OXIDE.—10¾d. per lb., according to quantity d/d U.K.; green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 3¼d. per lb.; liquor, £19 10s. per ton d/d.

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—LONDON: £4 2s. 6d. per cwt.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £26 per ton. SCOTLAND: 40%, £28 ex store.

LAMPBLACK.—£45 to £48 per ton.

LEAD ACETATE.—LONDON: White, £34 10s. per ton: brown, £1 per ton less. SCOTLAND: White crystals, £33 to £35; brown, £1 per ton less. MANCHESTER: White, £34; brown, £31 10s.

LEAD, NITRATE.—£28 per ton.

LEAD, RED.—SCOTLAND: £25 10s. to £28 per ton; d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid. LONDON: £37 10s.

LITHOPONE.—30%, £17 10s. to £18 per ton.
MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.
METHYLATED SPIRIT.—61 O.P. Industrial, 1s. 6d. to 2s. 1d. per gal. Pyridinised industrial, 1s. 8d. to 2s. 3d. Mineralised, 2s. 7d. to 3s. 1d. 64 O.P. 1d. extra in all cases. Prices according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.
NICKEL AMMONIUM SULPHATE.—£49 per ton d/d.
NICKEL SULPHATE.—£49 per ton d/d.
PHENOL.—8½d. to 9d. per lb. without engagement.
POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £38.
POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quantity. Ground 5½d. LONDON: 5d. per lb. with usual discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.
POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100%, powder, £37. MANCHESTER: £38.
POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.
POTASSIUM NIRATE.—SCOTLAND: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.
POTASSIUM PERMANGANATE.—LONDON: 9½d. per lb. SCOTLAND: B.P. crystals, 9d. MANCHESTER: Commercial, 8¾d.; B.P., 9¾d.
POTASSIUM PRUSSIATE.—LONDON: 8½d. to 8¾d. per lb. SCOTLAND: Yellow spot material, 8½d. ex store. MANCHESTER: Yellow, 8¼d. to 8½d.
RUPRON (MINERAL RUBBER).—£15 10s. per ton.
SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels.
SODA ASH.—58% spot, £5 15s. per ton f.o.r. in bags.
SODA, CAUSTIC.—Solid 76/77° spot, £13 17s. 6d. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 10s. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE.—£22 per ton. LONDON: £23.
SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 15s. ex quay or station. MANCHESTER: £10 10s.
SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous, 5d. per lb. LONDON: 4d. per lb. net for spot lots and 4d. per lb. with discounts for contract quantities. SCOTLAND: 4d. delivered buyer's premises with concession for contracts.
SODIUM BISULPHITE POWDER.—60/62%, £18 10s. per ton d/d 1-cwt. iron drums for home trade.
SODIUM CARBONATE (SODA CRYSTALS).—SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.
SODIUM CHLORATE.—£32 per ton.
SODIUM CHROMATE.—4d. per lb. d/d U.K.
SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £15 ex station, 4-ton lots. MANCHESTER: Commercial, £9 5s.; photographic, £15.
SODIUM META SILICATE.—£16 per ton, d/d U.K. in cwt. bags.
SODIUM NITRITE.—LONDON: Spot, £18 to £20 per ton d/d station in drums.
SODIUM PERBORATE.—LONDON: 10d. per lb.
SODIUM PHOSPHATE.—£13 per ton.
SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 4¾d. to 5¾d.
SULPHUR.—£9 15s. to £10 per ton.
SODIUM SILICATE.—140° Tw. Spot £8 per ton d/d station, returnable drums.
SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d SCOTLAND: English material £3 15s.
SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 15s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 5s.
SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 2s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8.
SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot, £9 10s. d/d station in bags.
SULPHATE OF COPPER.—MANCHESTER: £14 5s. to £14 10s. per ton f.o.b.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

Coal Tar Products

ACID, CARBOLIC.—Crystals, 8⅛d. to 8¾d. per lb.; crude, 60's, to 2s. 2½d. per gal. MANCHESTER: Crystals, 8r. per lb.; crude, 1s. 11d. to 2s. per gal. SCOTLAND: 60's, 2s. 6d. to 2s. 7d.
ACID, CRESYLIC.—90/100%, 1s. 8d. to 2s. 3d. per gal.; pale 98%, 1s. 6d. to 1s. 7d.; according to specification. LONDON: 98/100%, 1s. 6d.; dark, 95/97%, 1s. 3d. SCOTLAND: Pale, 99/100%, 1s. 3d. to 1s. 4d.; dark, 97/99%, 1s. to 1s. 1d.; high boiling acid, 2s. 6d. to 3s.
BENZOL.—At works, crude, 9d. to 9½d. per gal.; standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 7½d. to 1s. 8d. LONDON: Motor, 1s. 6½d. SCOTLAND: Motor, 1s. 6½d.
CREOSOTE.—B.S.I. Specification standard, 4d. to 4¼d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 3½d. f.o.r. North; 4d. London. MANCHESTER: 3½d. to 4¼d. SCOTLAND: Specification oils, 4d.; washed oil, 4¼d. to 4¾d.; light, 4½d.; heavy, 4½d. to 4½d.
NAPHTHA.—Solvent, 90/160%, 1s. 6d. to 1s. 7d. per gal.; 95/160%, 1s. 7d. to 1s. 8d.; 99%, 11d. to 1s. 1d. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160%, 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.
NAPHTHALENE.—Purified crystals, £9 15s. per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 70s. to 75s.
PITCH.—LONDON: £3 to £3 1s. per ton f.o.b. East Coast port for next season's delivery.
PYRIDINE.—90/140, 7s. 6d. to 9s. per gal.; 90/180, 2s. 3d. per gal.
TOLUOL.—90%, 2s. 1d. per gal.; pure, 2s. 4d.
XYLOL.—Commercial, 2s. 2d. per gal.; pure 2s. 4d.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex Toluol).—1s. 9½d. per lb.
ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 8d. per lb.
ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100%.
ACID, SULPHANILIC.—Spot, 8d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
p-CRESOL 34-5° C.—2s. per lb. in ton lots.
m-CRESOL 98/100%.—2s. 3d. per lb. in ton lots.
DICHLORANILINE.—1s. 11½d. to 2s. 3d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.
DINITROBENZENE.—8d. per lb.
DINITROTOLUENE.—48/50° C., 9d. per lb.; 66/68° C., 01½d.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.
β-NAPHTHOL.—Spot, £78 15s. per ton in paper bags.
α-NAPHTHYLAMINE.—Spot, 11½d. per lb., d/d buyer's works.
β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works.
o-NITRANILINE.—3ss. 11d. per lb.
m-NITRANILINE.—Spot, 2s. 7d. per lb., d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb., d/d buyer's works.
NITROBENZENE.—Spot, 4½d. per lb.; 5-cwt. lots, drums extra.
SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.
o-TOLUIDINE.—9½d. per lb.
p-TOLUIDINE.—1s. 11d. per lb.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—Home: £7 5s. per ton delivered in 6-ton lots to farmer's nearest station. Export: Nominal, £5 17s. 6d. per ton f.o.b. U.K. ports in single bags.
CYANAMIDE.—£7 5s. per ton carriage paid to any railway station in Great Britain in lots of 4 tons and oveer.
NITRATE OF SODA.—£7 18s. 6d. per ton delivered in 6-ton lots to farmer's nearest station.
NITRO-CHALK.—£7 5s. per ton delivered in 6-ton lots to farmer's nearest station.
CONCENTRATED COMPLETE FERTILISERS.—£10 15s. to £11 6s. per ton according to percentage of constituents.
NITROGEN PHOSPHATE FERTILISERS.—£10 5s. to £13 15s. per ton according to percentage of constituents.

Latest Oil Prices

LONDON, July 18.—LINSEED OIL was steady. Spot, £22 10s. (small quantities 30s. extra); July-Aug., £21; Sept.-Dec., £21 10s.; Jan.-April, £21 5s., naked. SOYA BEAN OIL was quiet. Oriental (bulk) July-Aug. shipment, £13 2s. 6d. per ton. RAPE OIL was quiet. Crude, extracted, £27; technical refined, £28 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £12 10s.; refined common edible, £15 10s.; deodorised, £17, naked, ex mill (small lots 30s. extra). TURPENTINE was lower. American, spot, 43s. per cwt.

HULL.—LINSEED OIL, spot, quoted £21 17s. 6d. per ton; July, £21 5s.; Aug. and Sept.-Dec., £21 7s. 6d.; Jan.-April, £21 5s. per ton, naked. COTTON OIL.—Egyptian crude, spot, £12 10s.; edible refined and technical, £14 10s.; deodoriseed, spot, £16 10s. per ton, naked. PALM KERNEL OIL, crude, f.m.q., spot, £15 10s. per ton, naked. GROUNDNUT OIL, extracted, spot, £19; deodorised, £23. RAPE OIL, extracted, spot, £26; refined, £27 10s. per ton. SOYA OIL, extracted, spot, £15; deodorised, £18 per ton. COD OIL, 25s. per cwt. CASTOR OIL, pharmaceutical, spot, 36s.; first, 31s.; second, 28s. per cwt. net. TURPENTINE.—American, spot, 45s. per cwt.

From Week to Week

THE TELEPHONE NUMBER of the editorial and advertisment offices of THE CHEMICAL AGE, and of other trade journals published by Benn Brothers, Ltd., at Bouverie House, Fleet Street, London, E.C.4, has been changed to Central 3212 (10 lines).

MR. R. H. STEIN, managing director of Honeywill & Stein, Ltd., chemical merchants, has been appointed a director of British Industrial Solvents, Ltd.

THE LIBRARY OF THE CHEMICAL SOCIETY will be closed for stocktaking from Monday, August 6, until Saturday, August 18, inclusive, and will close each evening at 5 o'clock from August 20 to September 15.

MR. WILLIAM ACKROYD BOWER, of The Larches, Kent Road, Harrogate, and formerly of Middleton St. George, Durham, chairman and manager of Thomas Ness, Ltd., owners of Black Banks Chemical Works, Darlington, left £162,927 (net personalty £155,826).

THE NITRATE SALES CORPORATION, Chile, has announced that an agreement had been reached with the representatives of the producers of synthetic nitrates. The agreement fixes quotas for Chilean nitrates on all European markets, with the exception of that of Poland, which produces sufficient for its own use.

THE IRISH FREE STATE imported chemicals, chemical fertilisers, drugs, perfumery, dyes and colours valued at £131,403 during May, as compared with £132,750 in the corresponding month of 1933. There were increased imports in copper sulphate, sodium compounds and fertilisers and a sharp decrease in medicinal preparations.

RESEARCH STUDENTSHIPS have been awarded by Clare College, Cambridge, to the following:—A. Marriage, minor research studentship of £100 for two years for chemistry; R. M. Barrer, Denman Baynes Studentship of £50 for one year for chemistry; B. M. Crowther, Denman Baynes Studentship of £50 for one year for physics: I. Kemp, research studentship of £50 for one year for chemistry.

AT THE BIRMINGHAM ASSIZES on July 11 Henry Warren, aged 37, a salesman, was sentenced to three years' penal servitude for stealing gold dust valued at £3,500 from a railway van in Birmingham. Warren pleaded guilty. It was stated during the proceedings that Warren was not the driver of the car with which the raid was carried out, nor the man who snatched the gold from the railway van. His part was that of look-out.

JOSEPH NATHAN AND CO., LTD., state that Mr. M. J. Nathan, after 51 years' service in the business, has retired from the board. Mr. Hugo Wolff and Lieut.-Col. E. A. Rose have been appointed directors. Mr. Fred C. Randall, director and secretary of the company, has relinquished the office of secretary to give his whole attention to his duties as financial director of the group. Mr. J. A. Nathan has been appointed secretary of the company.

HUDDERFIELD EDUCATION COMMITTEE are considering a scheme for the erection of a new Institute of Chemistry at a cost of £63,500. It has been realised for a long time that accommodation for the Chemistry Department at the Technical College is inadequate, and the Committee some time ago approved a plan for a new institute, but on a less ambitious scale than the present one. The Technical and Further Education Sub-Committee have now brought forward a scheme for the erection of a three-storey building near the Technical College on a site occupied by a house that will have to be pulled down if the scheme matures.

PHENOL AND CRESOL COMPOUNDS have attracted a good deal of attention in recent years owing to their importance in the plastics industry, and some researches have been conducted at Cornell University on the corrosion of metals in contact with wet and dry tar acids and tar acid vapours which throw considerable light on the suitability of commercial materials for handling compounds in these groups. Pure nickel and nickel-chromium corrosion-resisting steel were found to be the least attacked of the materials studied. In view of these results it is interesting to learn that pure nickel equipment is already in use in Germany for handling phenolic compounds.

TWENTY-SEVEN MEMBERS of the office staff of Hall, Forster, and Co., Ltd., manufacturing chemists, of Temple Street, Newcastle, were recently taken to Newcastle Infirmary suffering from suspected poisoning after drinking tea. It was stated that an analysis of the tea drunk on that occasion had revealed the presence of an alkaloidal poison of the homatropine group. It is known that homatropine had been used about that time as an ingredient in some eye ointment. It is suggested that the teapot lid may have been set down inadvertently on the laboratory bench and thus have picked up a minute quantity of the poison, which then found its way into the tea. All the persons affected have now entirely recovered.

IMPERIAL AIRWAYS LIMITED, at the Air Port of London, Croydon, have changed their telephone number to Croydon 4422 (10 lines).

DR. AND MRS. HERBERT LEVINSTEIN have taken Wing Lodge, Wing, Leighton Buzzard, and go into residence on August 15. Telephone, Wing 3.

NORTHERN FERTILIZERS, LTD., chemical manure manufacturers, etc., Bottlehouse Street, St. Peters, Newcastle-on-Tyne, have changed their name to Langdales and Northern Fertilizers, Ltd., as from July 11, 1934.

CHARLES HENRY ARTHUR FRENCH, until recently manager of the Canterbury branch of the Midland Bank, was remanded at Canterbury, on July 16, on a charge of stealing, on July 9, while manager of the branch, certificates for 260 shares in the International Nickel Co. of Canada, then in the bank's possession.

THREE FOREMEN AT THE ARDEER FACTORY, Stevenston, of the Imperial Chemical Industries, J. Picken, A. Gardiner and R. Conway, who have an aggregate of 110 years' service, have been presented with gifts on their retiral by members of the newly-formed Foremen's Association.

TO FURTHER THE RESEARCH WORK of the British Cotton Industry Research Association at the Shirley Institute, Manchester, the Master Cotton Spinners' Federation have decided to increase its grant by nearly 50 per cent. In former years it amounted to rather more than £6,000, but for the next five years it will be nearly £10,000 per annum.

MR. JACOB VAN DEN BERGH, of 26 Lyndhurst Road, Hampstead, London, N.W., a pioneer of the margarine industry in this country, late managing director of Van den Berghs, Ltd., and the founder of the business, left estate of the gross value of £259,417, "so far as can at present be ascertained," with net personalty £209,758, on which £69,396 has been paid on account of estate duty.

SIR MAX MUSPRATT, Bt., of The Grange, Fulwell Park, Liverpool, who died on April 20 last, left estate to the value of £208,044. Sir Max was a director of Imperial Chemical Industries, Ltd., and of the International Automatic Telephone Co., Ltd., and was a member of the Mersey Docks and Harbour Board. He was also a past-chairman of the Association of British Chemical Manufacturers, and a past-president of the F.B.I.

GEORGE BAGLEY, aged 46, of Biddick Terrace, Washington, County Durham, who was injured in the fire on Wednesday at the chemical works at Washington, has died in Newcastle Infirmary. He is the third victim. Three other men are still in hospital suffering from severe burns. The inquest on the three men was opened at Newcastle last night, and, after evidence of identification had been given, was adjourned until July 26.

MR. E. BARNARD, M.A., has been appointed as Director of Food Investigation in the Department of Scientific and Industrial Research, and Mr. F. Kidd, M.A., D.Sc., has been appointed Superintendent of the Low Temperature Research Station, Cambridge. Both of these posts were previously held by the late Sir William Hardy. Mr. Barnard has been Assistant Director of Food Investigation since 1931; he joined the Department of Scientific and Industrial Research on entering the Civil Service in 1919. Dr. Kidd, who has been on the staff of the Low Temperature Research Station since its establishment in 1922, has been engaged on Food Investigation work under the Department since 1918.

THE SALTERS' INSTITUTE OF INDUSTRIAL CHEMISTRY have announced their awards for the year 1934-35, which have been approved by the Court of the Salters' Company. Fellowships have been renewed to: J. D. Rose of Jesus College, Oxford; C. W. Woolgar of King's College, London. Fellowships have been awarded to: G. Broughton, of East London College; D. E. Wheeler, of Bristol University; L. R. Barrett, of Lincoln College, Oxford. The Salters' Institute has also awarded 136 Grants-in-Aid to young men and women employed in chemical works to facilitate further studies.

THE 1934 ALBERT MEDAL of the Royal Society of Arts has been presented to Sir Frederick Gowland Hopkins "for his researches in biochemistry and the constituents of foods." The Duke of Connaught, president of the Society, made the presentation on July 11. Speaking of Sir Frederick's researches, the Duke said "Your work has largely lain in the domain of pure biochemistry. Your discoveries have not only enriched this science but have done much to make a distinctive subject for study, attracting a large and enthusiastic body of research workers. Actually the discovery that foodstuffs contained certain factors now called vitamins, and that life could not be maintained on a synthetic diet alone, gave a new impetus to work on nutrition and to the study of deficiency diseases, in which work you have continued to take an active part. In consequence the world has acquired a clear conception of the vitamins, of the part they play in health and disease, and their distribution in various foods."

WALLSEND AND HEBBURN COAL CO., LTD., have placed a contract with Birtley Co., Ltd., ironfounders and engineers, for a coal separation and cleaning plant, which, it is claimed, will be the most complete and up-to-date in the world. The plant will have facilities for both wet and dry cleaning, and it will also incorporate, for the first time in this country, a system for clarifying water in which coal dust and "slurry" is present. This device is expected to be applied to river polution problems. It clarifies water in less than a minute, as against 20 hours by gravitation methods. The new plant is to be working by February.

THE SHIPMENT OF A CONSIGNMENT OF BARYTES quite recently for Widnes is a constituent of Devon's mineral wealth, which appears to be reviving. Its principal use is in the manufacture of paint (as a pigment or filler) and the Devon product has always been of good repute, and like china clay has borne better analysis than its foreign competitors. The mine at Bridford in the Teign Valley is the only mine in the South of England, the other sources of supply being in Shropshire and Cumberland. Nearly 60 years ago a company, called the Devon Baryta Co., was formed to exploit this mineral in Devonshire. About six years ago the Bridford mine was acquired by the Shropshire Mines, Ltd., with the result that the production of Baryta has been extended. Between 1885 and 1926 there were about 150,000 tons dealt with in Devon and the mine does not appear to show any signs of decline.

GERMANY IS A LEADING PRODUCER of oxalic acid, and part of the German output is destined to foreign shipments, exports reaching a peak (of recent years) in 1931. There was a considerable recession in 1932, and the trade was sustained last year at only slightly below 1932 figures. This year a renewed marked downward trend set in, and exports in the first two months amounted to only 6,438 tons (266,000 marks), compared with 578 tons (348,000 marks) in the first two months of 1933.

THE NETHERLANDS NITROGEN INDUSTRY suffered from declining exports during 1933. The price situation was due to various causes, among them the unsatisfactory condition of agriculture, especially in important export markets such as Netherland India; general overproduction throughout the world, which the syndicate's restrictive measures have not yet entirely eliminated; and the low florin yield of sales made in depreciated currencies. In various foreign markets Japanese competition made itself keenly felt. The production quotas allotted to Netherlands factories were considered fairly liberal, in some cases not far below capacity. The factory at Sluiskil, however, which is operated with foreign capital, was an exception in this respect and was obilged to curtail its output drastically. There is evidence that domestic consumption of nitrogenous fertilisers is developing fairly satisfactorily (considering the depressed condition of agriculture), with a growing tendency to use domestic materials.

New Companies Registered

Morris Allison & Co., Ltd., 155 Victoria Street, London, S.W.1. Registered July 6. Nominal capital, £1,000. Manufacturers of chemicals, colours, and inks, analytical, wholesale and retail chemists, etc. Directors: Walter Morris Allison, Geo. E. Hooke.

Electrolytic Iron Co., Ltd.—Registered as a "private" company on June 28. Nominal capital £10,000. To carry on the business of manufacturers of sheets and other products from iron, steel and other metals by electrolytic or other methods, buyers, sellers and dealers in metals, sheets and other products, etc., and to adopt agreements (1) with E. Kelsen, E. Ausnit, Kelsen Special Steel Holding, Kelsen Blackplate Holding and Richard Thomas & Company, Ltd., and (2) with E. Kelsen, E. Ausnit, Kelsen Special Sheet Holding and Kelsen Blackplate Holding. A subscriber: A. I. M. Duncan, 21 Leadenhall Street, London, E.C.

Graesser Salicylates, Ltd.—Registered July 16. Nominal capital £10,000. To enter into an agreement with R. Graesser, Ltd., and to carry on the business of manufacturing chemists, carbolic acid manufacturers, picric distillers, etc. Directors: Norman H. Graesser, Franz R. Graesser-Thomas, Herbert S. Diggery. Solicitors: Stafford, Clark and Co., 3 Laurence Pountney Hill, Cannon Street, London, E.C.4.

The Peat Fuel Co.—Registered in Dublin as a public company on July 12, 1934. Nominal capital £80,000. To carry on the business of manufacturers and vendors of peat products of all kinds, etc. Directors: Gabriel Brock, 39-41 Dame Street, Dublin; Rt. Hon. Lord Glenavy, Henry E. Guinness, Frederick P. Griffith.

The Prince Regent Tar Co., Ltd., Brettenham House, Wellington Street, Strand, London, W.C.2.—Registered as a "private" company on July 4. Nominal capital, £150,000. The objects are to acquire that portion of the undertaking and goodwill of the business heretofore carried on by Burt Boulton and Haywood, Ltd., as tar distillers, at their Silvertown and Hertford Works, at Silvertown, E., and Hertford, and to carry on the business of tar distillers, manufacturers of and dealers in coke, coal, tar, pitch, creosote, ammoniacal liquor and other residual products, alizarine coal-tar, colours, dyes and dyestuffs, chemicals and chemical products, manufacturing chemists, colliery owners, and owners of fireclay and other mines and minerals, metallurgists, electrical, mechanical and general engineers, manufacturers, merchants and suppliers of gas, producers and suppliers of electricity, wharfingers, shipowners, etc. Directors: Oscar E. Boulton, Harold C. Smith, William J. Sandeman, Alistair G. Saunders, Walter C. Forbes.

New Chemical Trade Marks

Compiled from official sources by Gee and Co., patent and trade mark agents, Staple House, 51 and 52 Chancery Lane, London, W.C.2.

Opposition to the registration of the following trade mark can be lodged up to August 11, 1934.

Formvar. 550,069. Class 1. Synthetic resin in powdered form being a chemical substance for use as an ingredient in manufactures. Shawinigan, Ltd., Marlow House, Lloyd's Avenue, London, E.C.3. April 5, 1934.

Books Received

A Summary of Food Laws and Regulations. By C. L. Hinton. London: The Nema Press, Ltd. Pp. 90. 21s.

Faraday. By Thomas Martin. London: Gerald Duckworth & Co., Ltd. Pp. 143. 2s.

Transactions of The Institution of Chemical Engineers. Vol. 11. 1933. London: Institution of Chemical Engineers.

The Diffraction of X-Rays and Electrons by Amorphous Solids, Liquids and Gases. By J. T. Randall. London: Chapman & Hall. Pp. 290. 21s.

Official Publications

The National Physical Laboratory. Metrology Department. Tests on Volumetric Glassware. April, 1934. London: The National Physical Laboratory. Pp. 34.

Merseyside Employments for Boys and Girls. The Manufacturing Industries. Liverpool Education Committee. Pp. 110. 6d.

Imperial Institute. Annual Report 1933. By Lt.-Gen. Sir William Furse. London: Imperial Institute. Pp. 56. 2s.

70th Annual Report on Alkali, etc. Works, by the Chief Inspectors. Proceedings during the Year 1933. London: H.M. Stationery Office. Pp. 46. 9d.

Company News

English China Clays.—The payment will be made on August 1 of arrears of dividend on the cumulative preference shares at the rate of 7 per cent. per annum for the three months ended September 30, 1932.

W. and T. Avery.—For the year to March 31, 1934, the net profit amounted to £102,925, against £95,512 in the previous year. The directors recommend a final dividend on the ordinary shares of 10 per cent., making 15 per cent. for the year. The amount carried forward is £59,590.

Consolidated Tin Smelters, Ltd.—An ordinary dividend is announced at the rate of 5 per cent. The net revenue for the year to June 30 last amounted to £170,977, compared with £106,377 in the previous year, when £20,344 was received from a subsidiary out of a pre-merger reserve.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Belgium.—A firm of agents and concessionaires, established at Brussels, wish to obtain the representation of United Kingdom manufacturers of pharmaceutical specialities, on a commission basis or terms to be arranged. (Ref. No. 61.)

Portugal.—An agent established at Oporto wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of chemicals and colours for the glass, ceramic and enamelled iron ware industries, chrometan (oxide of chrome for tanning purposes). (Ref. No. 64.)